THE IRON AGE

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THE IRON AGE

New York, Thursday, October 11, 1906.

The Seamless Pressed Steel Bathtub.

Description of the Processes Used by the Seamless Pressed Steel Bathtub Company, Detroit.

Almost two years ago a company was organized in Detroit by a number of prominent local business men to put to practical test a process in the development of which Eugene H. Sloman of that city had spent four years, having as its object the making of a bathtub from a single sheet of steel by cold drawing. To-day the plant is in full operation and the tubs are being produced at the rate of about 100 a day. In a few days a sufficient stock of finished tubs will have been manufactured to warrant their being placed upon the market and a new industry will have been brought into existence.

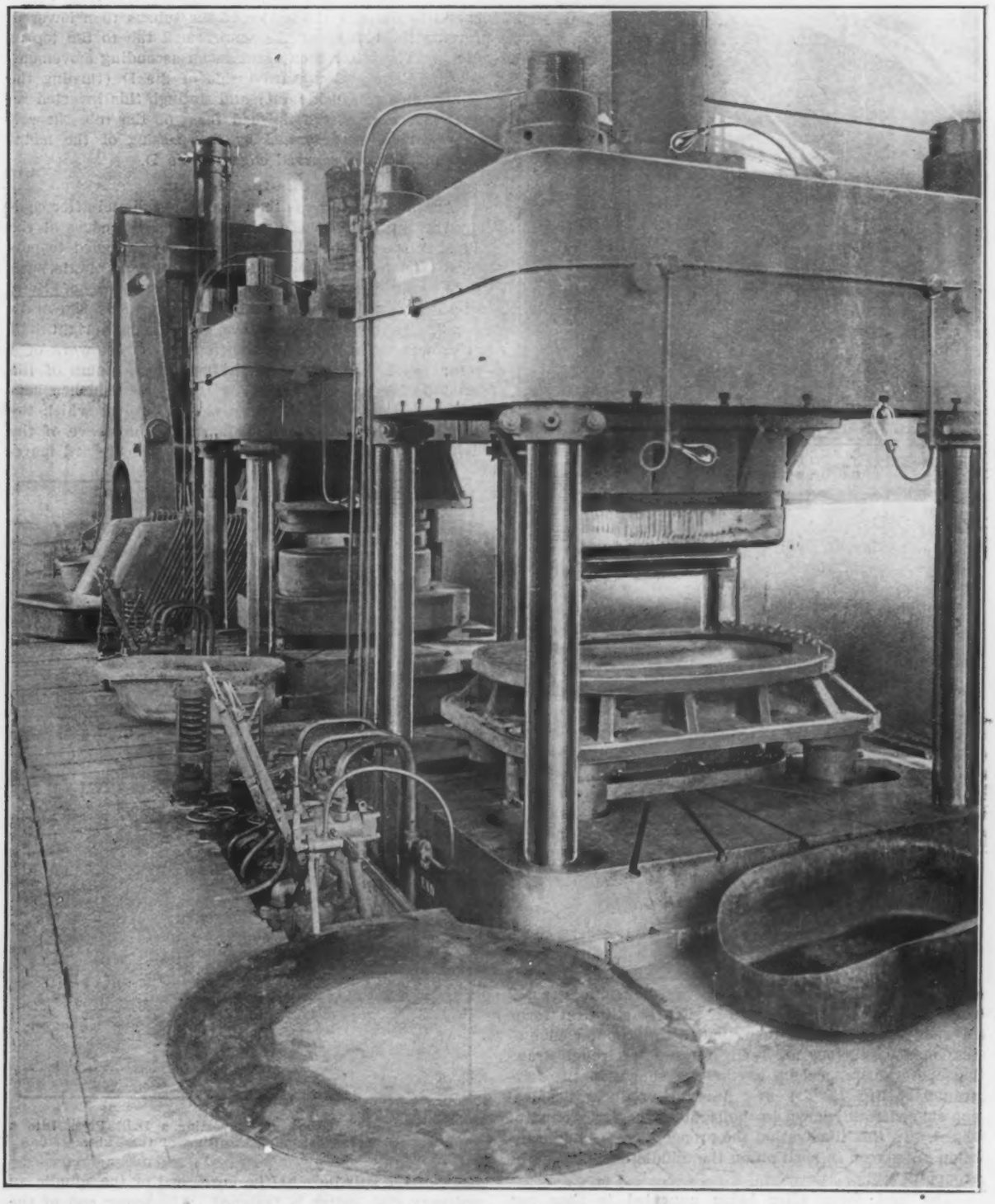


Fig. 1.—General View, Showing the Three Principal Presses Employed and Specimens of the Work in Its Various Stages of Formation.

The problems attending the pressing of a sheet of steel, slightly more than ⅛ in. thick, into the irregular shape of a bathtub, with its roll shaped rim; the elimination of

the wrinkles bound to occur in the steel due to the sloping shaped end and sides, and finally the enameling of the tub both inside and out, were to say the least perplexing. The various methods through which the Seamless Steel Bathtub Company has solved them are not only interesting, but in certain instances are distinctly novel and of importance as contributions to the mechanical arts.

The plant, which when speeded up to its normal production will have a capacity of 150 tubs a day, represents an outlay of about $500,000. The principal equipment consists of three massive hydraulic presses. Two of these are 850-ton drawing presses, each weighing about 250,000 lb. They are used for drawing the steel from the sheet into the form of the bathtub. The third press is the most important device used in the entire process. It is a most ingenious piece of machinery, performing functions never before sought to be accomplished in a similar manner. It is called a rocker-roller press and is used for rolling out the wrinkles from the drawn shapes and at the same time setting the metal so as to prevent distortion resulting from further heating. Incidentally, the principles embodied in this machine suggest their adaptability to other branches of the manipulation of metals. This machine weighs about 350,000 lb. and like the other two presses, as well as the hydraulic plant, was furnished by R. D. Wood & Co., Philadelphia.

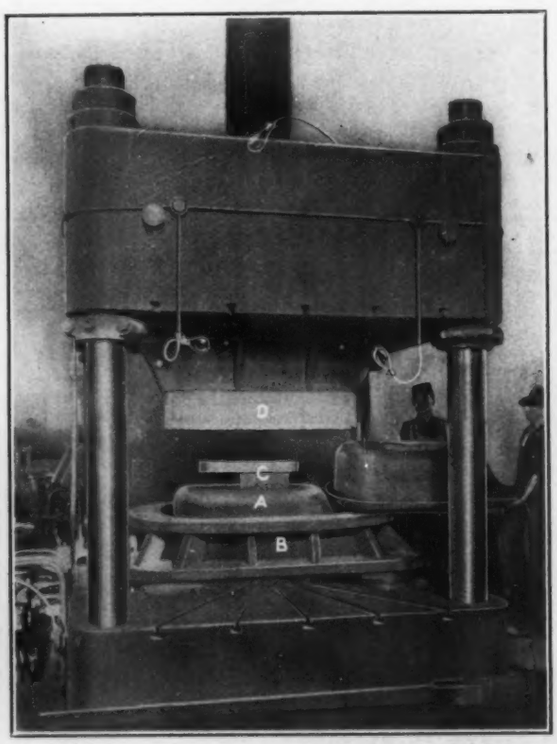


Fig. 2.—One of the Drawing Presses, Showing the Arrangement of Dies Used for the Final Drawing Operation.

The Drawing Operations.

The three presses are shown in Fig. 1, where specimens of the work in the various stages of process are also shown. The sheets, which are of No. 11 soft steel, 60 in. wide and 78 in. long, are first taken to a small rotary shear and trimmed to a slightly elliptical form. A crude oil lubricant is then applied to the outer edge of the surface and they are ready for the first rough drawing operation, appearing as the one shown in the foreground of Fig. 1. The first drawing produces the oval cup shaped form shown in the right of the foreground of Fig. 1. In this illustration the proper dies for this operation are shown in position on the middle machine of the group.

The first form after being annealed is then put through a process of inverted redrawing which produces the final irregular shape of the finished tub and its roll shaped rim. The machine shown in Fig. 2 illustrates the form of dies used in this operation. This illustration shows the dies as they appear upon the completion of the final drawing, a finished tub, just taken from the press, being shown in the hands of the operators on the right of the picture. The tub is shown in an inverted position, which is as it leaves the press. Projecting upward from the top of die A will be seen the ejector C, which is raised to lift the tub off of the die at the completion of the drawing operation, but which is lowered so that it forms part of the die when it is not performing this function.

Before the semiformed tub is placed in the press for the finishing drawings which give the sloping end and roll shaped rim the ejector is lowered so that it comes flush with the surrounding surface of die A and this die is then lowered until it is well down inside of the die box B. The work is then placed in this aperture, bottom down. Die D, which is hollowed out to correspond to its male die A, and has its lower edges rounded to correspond to the roll of the rim of the tub, is then lowered, forcing the bottom of the semiformed tub to the top of die A. The latter then assumes an ascending movement, forcing the metal upward inside of die D (turning the semiformed tub inside out) and through this inverted redrawing creating the finished form of the tub, the roll shaped rim being formed by the passing of the metal around the lower curved edges of die D.

Trimmipg the Rim.

Another annealing is then given the tub and after cooling the surplus metal is trimmed off of the edges of the rim. A special machine was originally designed to perform this work, but owing to his inability to obtain such a machine within a reasonably short space of time, President du Pont resorted to the expedient shown in Fig. 3. As the engraving shows, an ordinary upright drill press was taken and rigged up to perform the work of a rotary shear. Fastened to the base and column of the machine is a cast iron box, on the top of which a support is bolted which carries a sleeve through which the drill spindle revolves and upon which the sleeve of the drill spindle rests, thus preventing any downward movement of the spindle. At the lower end of the spindle an ordinary disk cutter is fastened. The upper end of the drill spindle has a spur pinion keyed to it which meshes with a spur gear attached to the upper end of a special spindle placed a short distance in back of the drill

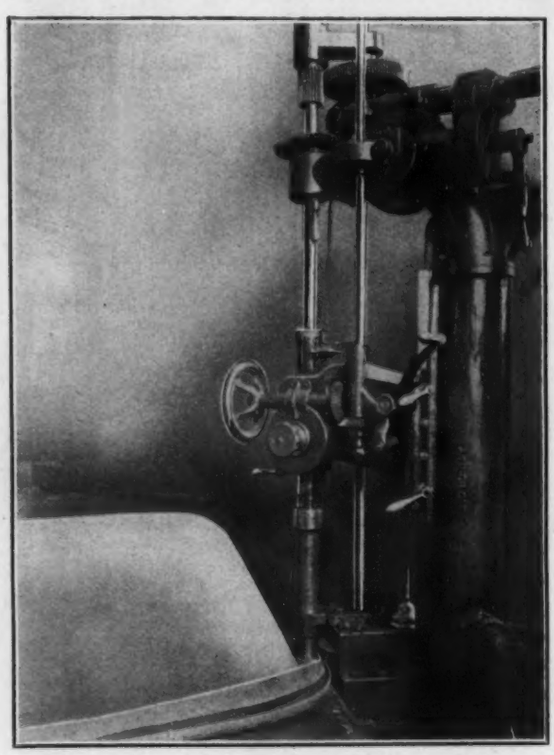


Fig. 3.—A Novel Method of Converting a Drill Press Into a Shear for Trimming the Rims of the Tubs.

spindle. This spindle (which in the illustration is partly hidden by the feed change rod) has its lower bearing in the cast iron box and at its lower end carries the other disk cutter. A table is placed in front of the machine and the rims are cut down with remarkable ease and rapidity, the tubs being moved about on the table by hand.

When the tub leaves this machine it has its finished size and shape, but by passing one's hand along the sides perfectly smooth surface throughout the entire tub. At the same time the metal is set so that in after heating, which, of course, is necessary in the enameling process, there is no distortion due to the strains in the metal releasing themselves under the heat. This is accomplished by reason of the fact that in the rocker-roller press the metal in the irregular shape of a bathtub is rolled out just as evenly at every point and on the same principle as is a flat sheet when pressed between

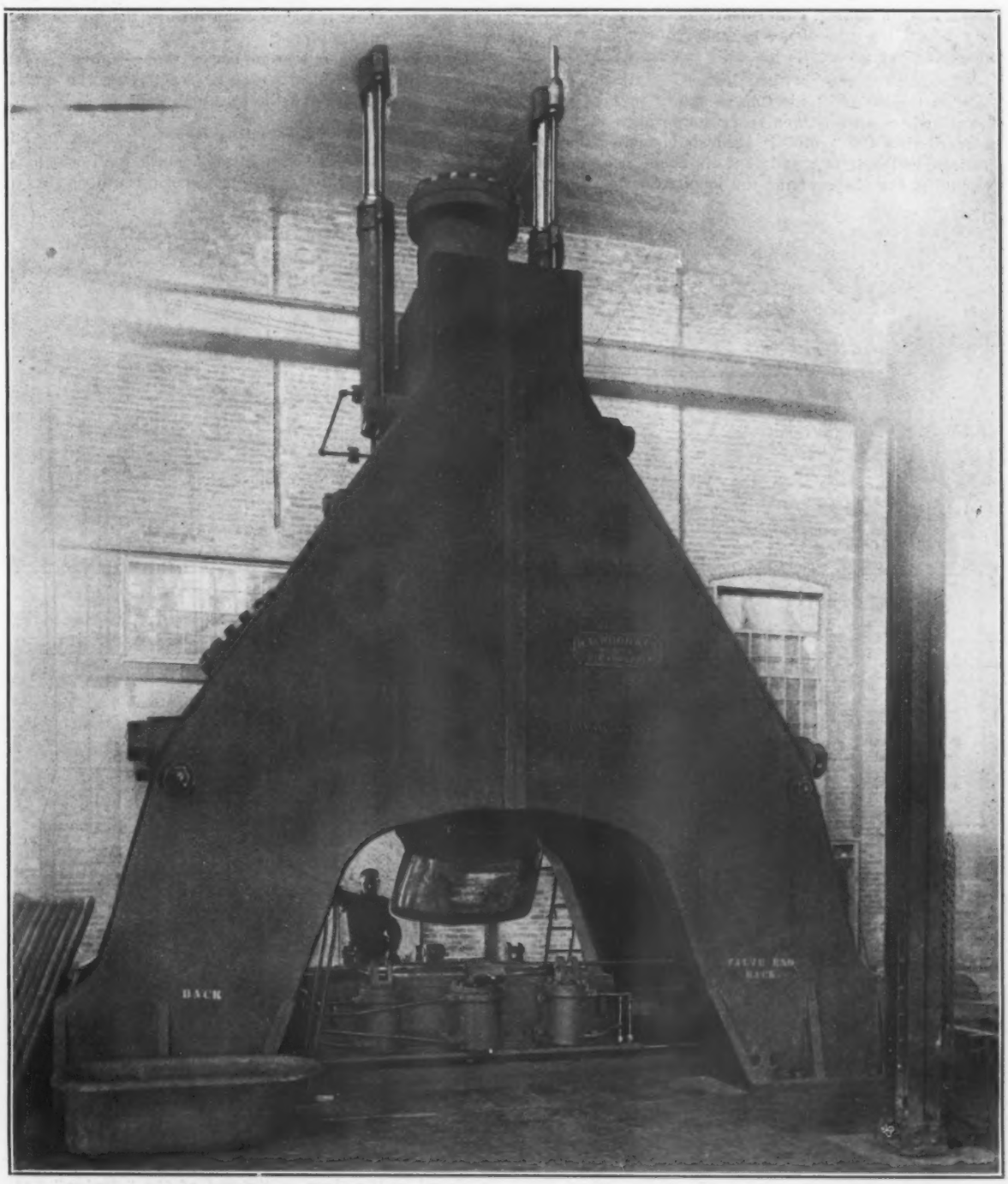


Fig. 4.—The Oscillating and Reciprocating Rocker-Roller Press Used for Rolling Out the Wrinkles from the Tub in Its Finished Shape and at the Same Time Setting the Metal.

and ends corrugations can be felt which are the wrinkles resulting from the drawing operations. These must be eliminated and it is for this purpose that the machine shown in Fig. 4 was designed. It has been named by Eugene H. Sloman, its inventor,

The Rocker-Roller Press.

This is a gigantic machine exerting simultaneously vertical, lateral and diagonal pressures of sufficient volume to so change the flow of the metal as to result in a a pair of rolls. The accomplishment of this is surely unique, and great credit is due Mr. Sloman for the courage he displayed in saving this machine from what threatened to prove total failure.

The process consists of a cast iron A frame having a series of five hydraulic rams, each capable of exerting a pressure of 200 tons, and being so arranged that this pressure can be brought to bear in three directions simultaneously. The construction of the machine is shown in Fig. 5. It will be seen that the vertical ram carries a

rocker, which permits the oscillation of the "roll" or punch suspended at its extreme lower end. Attached to each side of the rocker is a hydraulic buffer ram, and immediately above the "roll" two saddles are placed so as to come exactly in contact with the buffer rams when the oscillating end of the vertical ram is swung over sufficiently to either side. At each side of the machine at its base there is a horizontal ram also having a capacity of 200 tons pressure. Both of these rams are connected to a bedplate or die box, which when actuated by the horizontal rams travels back and forth like the bedplate of a planer. In this bedplate there is a die into which the tub about to undergo the finishing or smoothing out process is placed.

The vertical ram is then lowered until the "roll" rests on the inside of the tub, as shown in Fig. 6. The downward pressure is then brought into play. It will be observed that the "roll" is somewhat smaller than the die into which it fits, and that its shape does not correspond to the shape of the tub longitudinally. When it is brought down into the center of the tub and the proper pressure exerted it fits on a knife edge transversely across the center of the tub. One of the horizontal rams is then placed in operation and the bedplate is pushed sideways, with the result that a rolling action takes place within the die, the "roll" slowly traveling with the bedplate as a result of the pressure of the horizontal ram. The shape of the "roll" is such that its end fits snugly into the end of the tub at just about the time when the saddle on the opposite side of the ram comes in contact with the buffer ram, as shown in Fig. 7. The simultaneous pressure of the three rams is then brought into play and just enough additional pressure is given the horizontal ram to overcome the pressure of both the vertical and buffer rams, with the result that the "roll" continues to roll the metal perfectly smooth right out to the rim of the tub. The horizontal ram on the opposite side of the machine is then brought into action, and the same process smoothes out the opposite end of the tub.

The small vertical rams on each side of the bedplate shown in the illustrations were designed for clamping purposes, but it has been found unnecessary to use them.

Punching.

After the tub leaves the rocker-roller press it is taken to the hydraulic punch shown in Fig. 8, where in a single movement of the plunger the hole in the bottom of the tub to which the waste pipe is attached is punched and a groove surrounding it is countersunken. The tub is then taken to a horizontal punch, as shown in Fig. 9. Here three holes are punched simultaneously in the end of the tub. These holes are for attaching the faucets and the overflow waste pipe.

Following this operation comes the cleaning. Wire brushes and sand blast are used for freeing the metal from scale and dirt and the tubs are ready for

The Enameling Room.

Here the tubs are first given a slush coat, which is applied both inside and out by means of a brush, as shown in Fig. 10. They are then fired, being conveyed or "shipped" to the muffle furnace by means of a fork suspended by a chain from a jib crane, as shown in Fig. 11. After the firing the hot tubs are placed in the cradle shown in Figs. 11 and 12, and here the "dredging" operation is performed. This consists of sifting the porcelain over the inside surface of the tubs, as shown in Fig. 12. The porcelain, which is in the form of a very fine powder, is placed in the sieve at the end of the "dredge." At the opposite end of the handle there is a small pneumatic hammer which is set in motion, with the result that a slight steady vibration is given the dredger, causing the porcelain to fall in a thin even stream. As the operators move the "dredges" about another man manipulates the cradle by means of hand wheels, as shown in Fig. 12, so that the porcelain may fall on the sides and ends of the tubs. Another firing melts the porcelain powder so that the inner surface of the tubs obtains the hard glossy finish of a porcelain tub.

There are three of the muffle furnaces, each having a capacity of 75 tubs a day. Coal and coke are used as

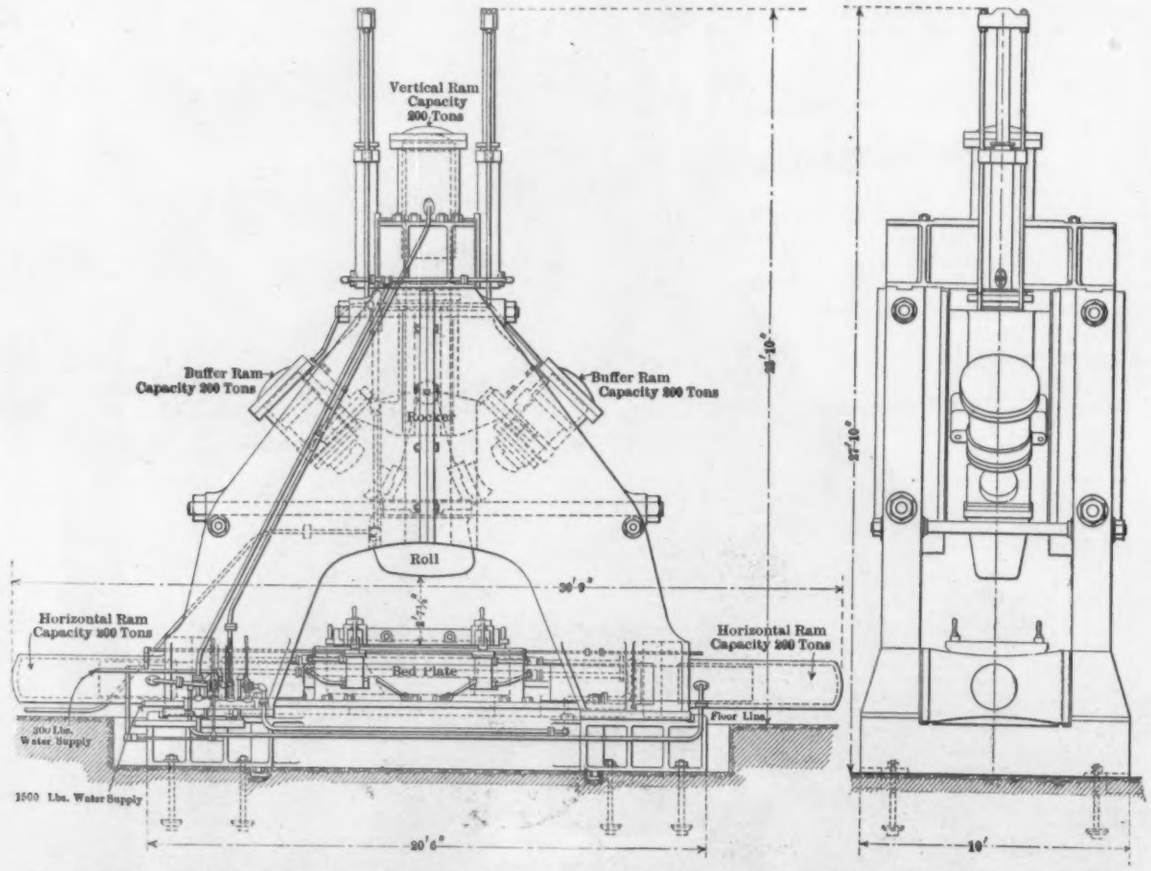


Fig. 5.—Side and End Elevations of the Rocker-Roller Press, Showing the Details of Construction and Principal Dimensions.

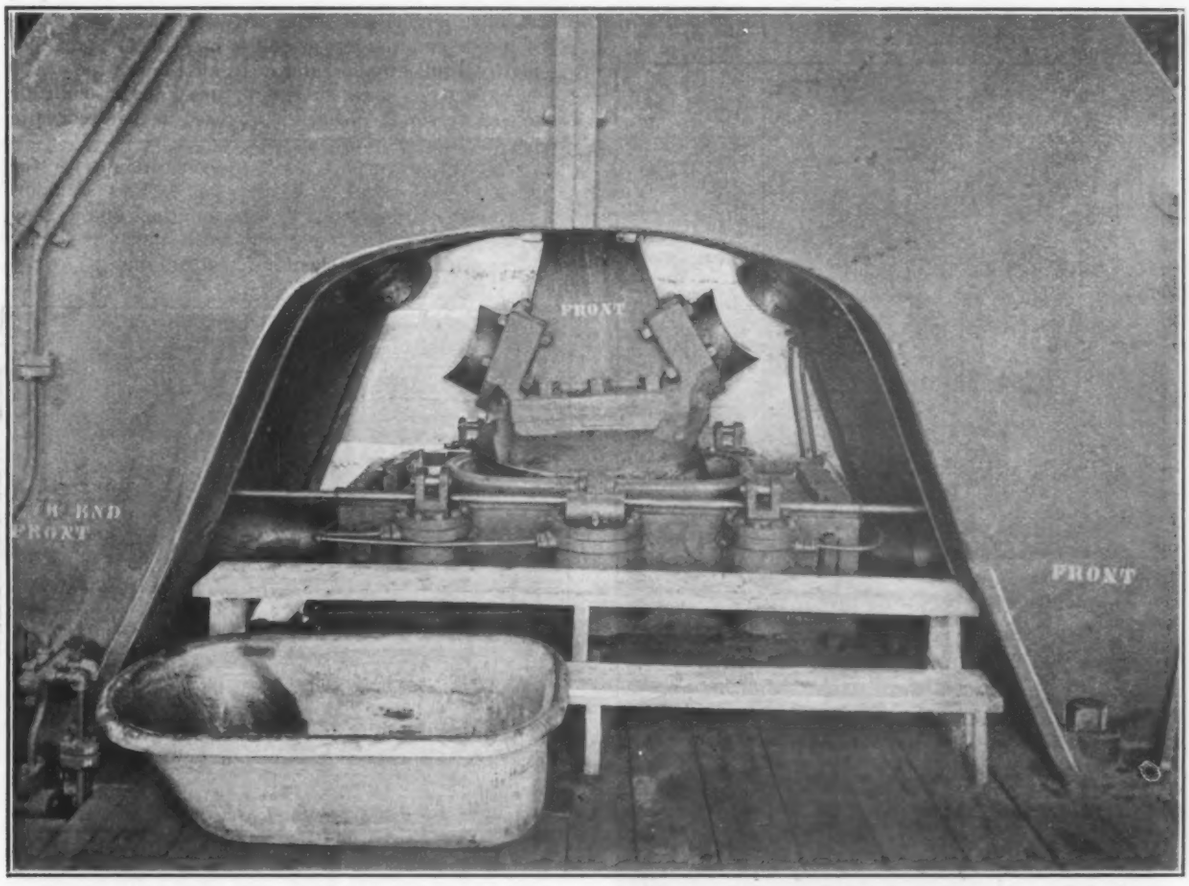


Fig. 6.—Detail View of the Rocker-Roller Press with the Roll in Position at the Beginning of the Rolling Operation.

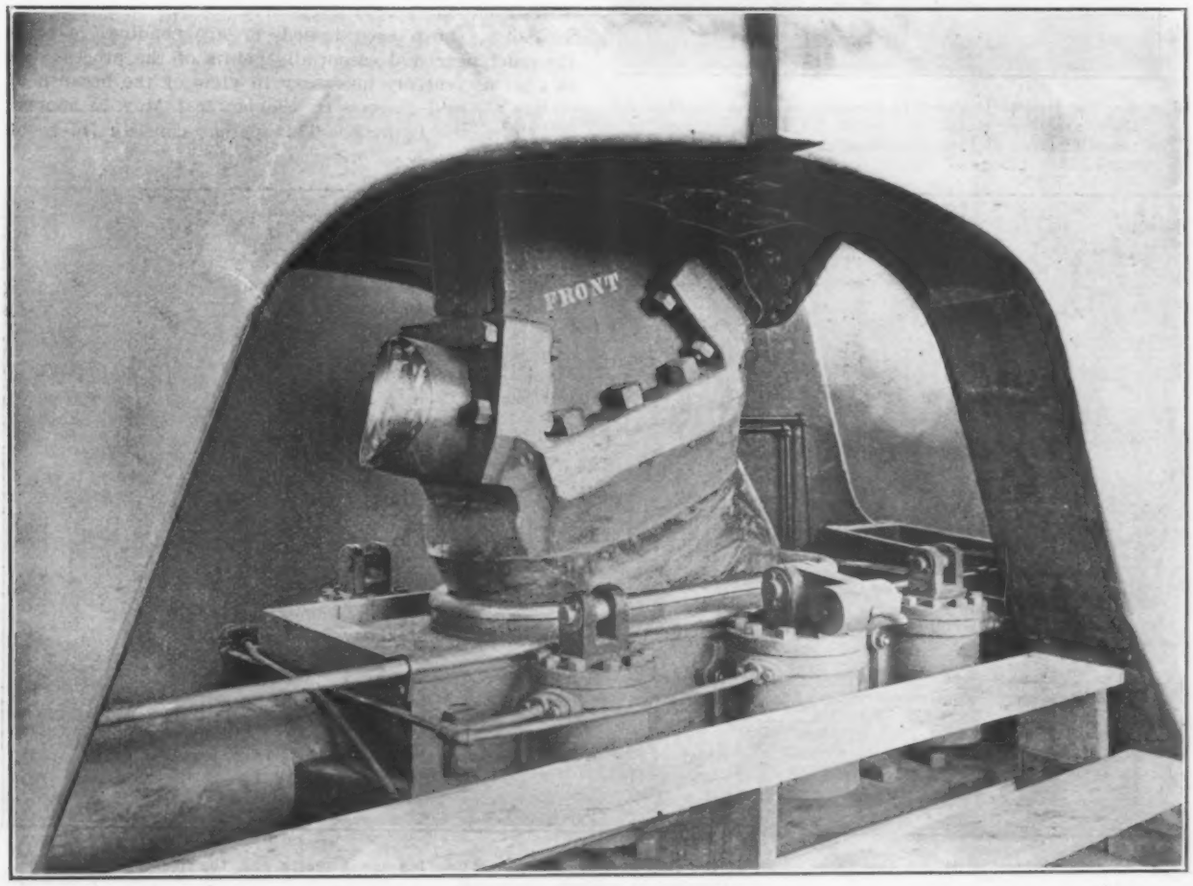


Fig. 7.—The Roll of the Rocker-Roller Press Rolling Out the End of a Tub, the Rocker Arm Being in Contact with One of the Buffer Rams and the Roll Raised Slightly to Give a Clearer View of the Operation.

fuel. Another large furnace is used for making the porcelain, the balance of the equipment in this department consisting of grinding mills, dryers and mixers.

Other Features of the Plant.

The two principal buildings of the works are respectively 103 x 144 ft. and 103 x 126 ft. in size. They are of

steel, brick, concrete and tile construction throughout. Large windows and skylights afford plenty of daylight

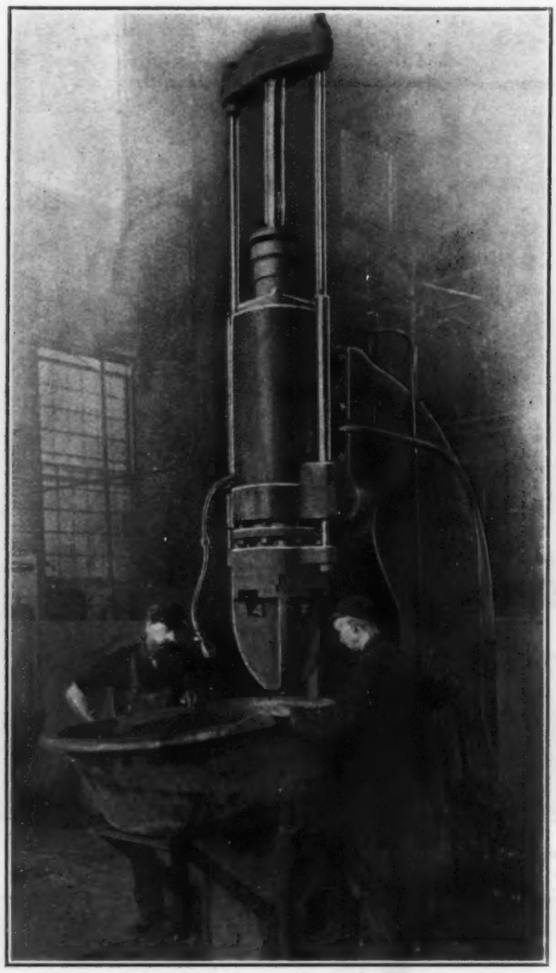


Fig. 8.—The Hydraulic Punch in Position to Punch the Hole for the Waste Pipe in the Bottom of the Tub.—A Recess Surrounding This Hole is Countersunk with the Same Movement of the Plunger.

for the workingmen, this being particularly true in the enameling room.

The hydraulic plants consist of three pumps having respective capacities of 2000, 1200 and 300 gal. per minute. Each of these pumps into an accumulator. There is a 75-kw. Fort Wayne generating set used for lighting purposes and driving the few machines used in the plant that are not hydraulically operated. An air compressor of 250 cu. ft. capacity is used for the air blast and a small air brake compressor furnishes the air used in the dredges in the porcelaining department.

An annealing furnace used in connection with the dredging operation has a capacity of 30 tubs an hour. The furnace is large enough to hold four tubs and as they are placed into it at one end and taken out at the other a tub remains under the heat for eight minutes.

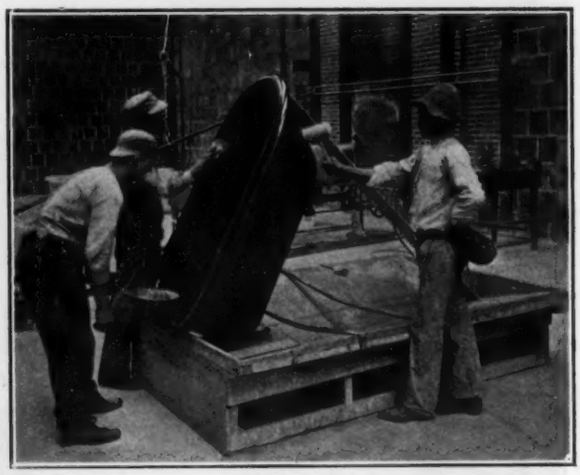


Fig. 10.—The First Operation in the Enameling Process.—Application of the "Slush" Coat to the Entire Surface of the Tub.

Two Cahall vertical water tube boilers are employed, each having a capacity of 250 hp. When all of the furnaces are in operation the utilization of their waste heat is sufficient to operate the boilers.

Patents have been issued, or are pending, covering the machinery and essentially points of the process, but this seems scarcely necessary in view of the breadth of claims allowed Eugene H. Sloman last May in connection with the bathtub. This patent consists solely of the following:



Fig. 9.—The Manner in Which the Three Holes at the End of the Tub, for Attaching the Faucets and the Waste Pipe, Are Punched in a Single Operation.

Claim.—1. A bathtub made from a single sheet of metal in which the metal is in such a state of rest that it can be reheated without distortion when cooled.

2. A porcelain coated bathtub in which the metal body

is formed from a sheet of metal in such a state of rest that on reheating it to apply the porcelain it was not distorted when cooled.

The Organization.

The Seamless Steel Bathtub Company was organized in December, 1904, with a capitalization of $600,000, which has since been increased. The following are the officers of the company: President, A. B. du Pont; vice-president, Eugene H. Sloman; secretary and treasurer, George B. Russel. The directors include, besides the above named gentlemen, Theodore D. Buhl, Joseph Boyer, A. E. T. White, A. C. Pessano, George H. Barbour, Jr., and W. P. Stevens. E. R. Stoddard is superintendent of the works.

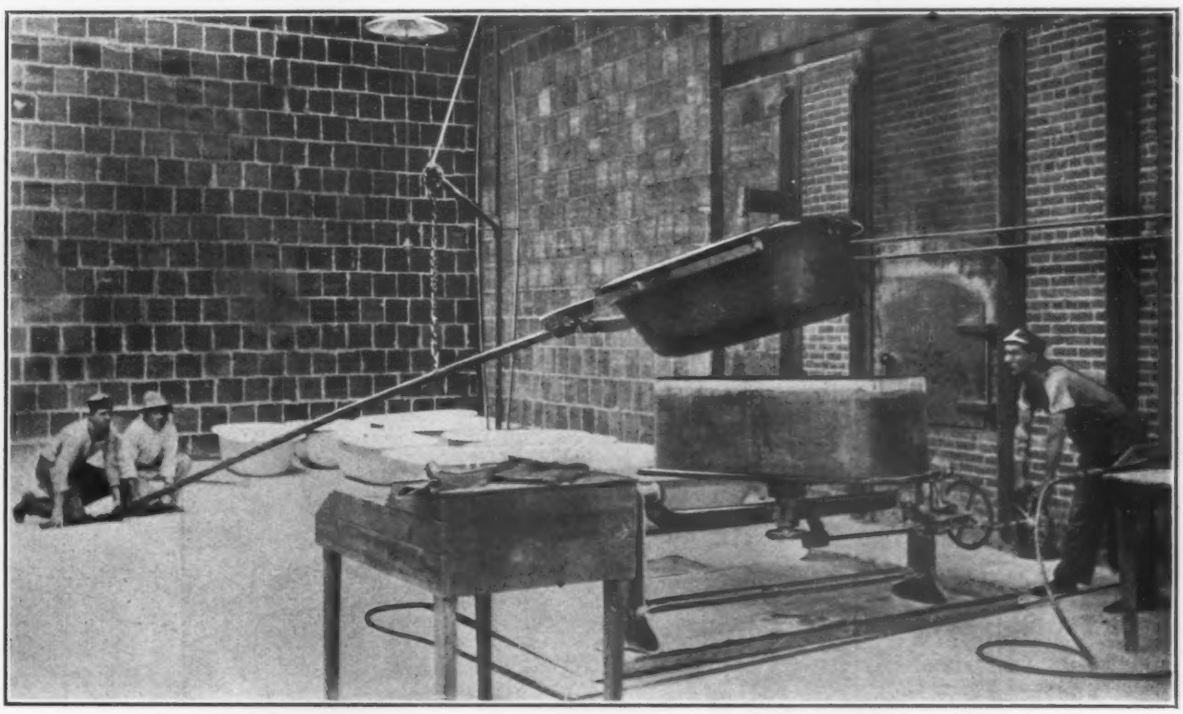


Fig. 11.—The Method of Handling the Tubs During the Enameling or Porcelaining Operations.

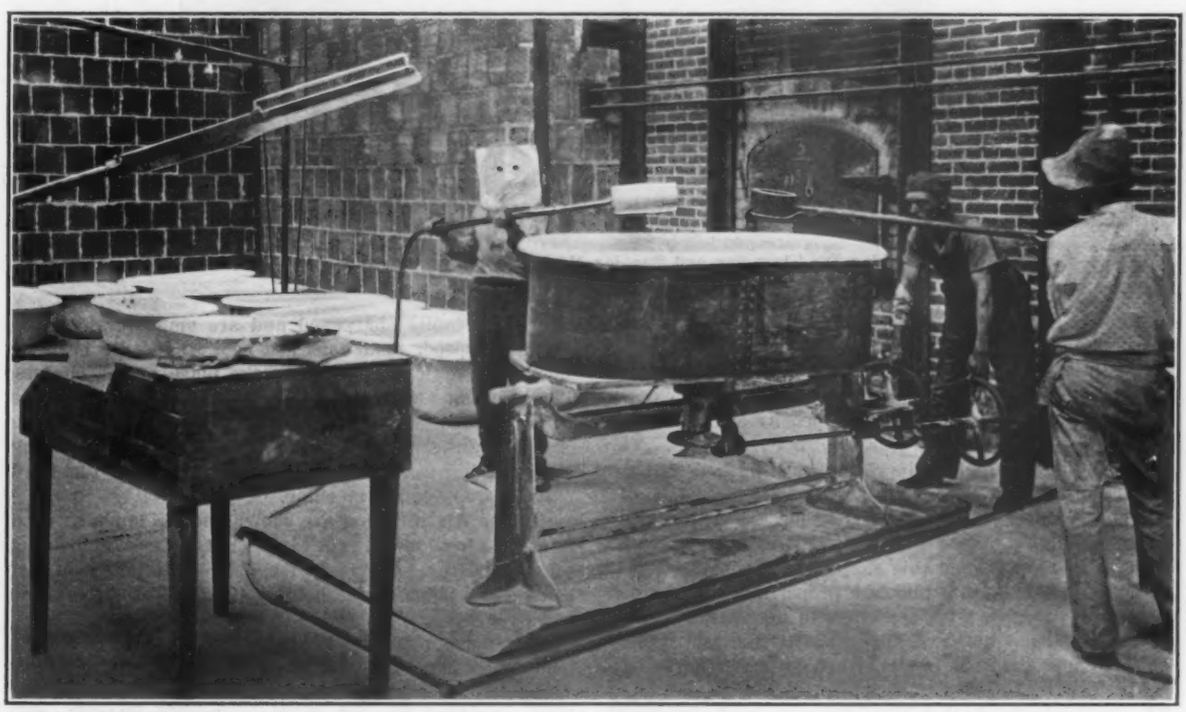


Fig. 12.—"Dredging" or Sprinkling the Powdered Porcelain on the Inner Surface and Rim of the Tub Before the Final Firing.

A Middlesbrough, England, market letter refers to a recent sharp drop in the market value of the shares of the Dunderland Iron Ore Company, whose iron ore concentrating and briquetting plant (the former of the Edison type) has been put in operation this year at Guldsmedvik i Ranen, Norway. The directors of the company in their annual report admit that some difficulties were encountered in making iron ore briquettes, but affirm that the problem has been satisfactorily solved. Shipments of the briquettes have been made for some time to the Consett Iron Company, Consett, County Durham, England, and satisfactory results are reported in the blast furnace. The ordinary shares of the Dunderland Company, which are of £5 par value, had shown a rather rapid advance to 38s. 6d. and had suddenly fallen to 27s. However, later sales have been made at 32s. 6d., which is close to the average price for the greater part of this year.

The New Little Giant Open Die Machine.

The Little Giant bolt cutting, nut tapping and pipe threading machines with opening dies, constitute an improved line recently developed by the Wells Bros. Company, Greenfield, Mass. Cut gears are used throughout and the machines are geared to give more than the usual power of bolt cutting machines. The claims for them in addition to proper design and proportions are unusual simplicity in both construction and operation, and great efficiency, durability, precision and accuracy. Fig. 1 gives a general view of the size known as No. 1½.

The die head, a most important part of an opening die bolt cutter, is made with the wearing parts of tool steel, hardened and ground. It is short, bringing the chasers so near the spindle bearing that it is particularly firm in operation.

A partly broken out view of the die head in open position is given in Fig. 2, and Fig. 3 shows the closed position, partly in section, from which the action will be easily discernible. When the cam ring A is forced back, or to the left, it moves the chaser lever B down and allows the latter through its opposite end to retract the chaser C, or, in other words, to open the dies. The dies being beveled, when the cam ring is pushed forward the action of the ring on the die forces it in and allows the chaser lever to move back under the ring. This method is simple, yet as effective as the more complicated ways, it is claimed, and this simplicity of construction is an advantage in that it allows a proper amount of stock in all parts to give them the strength necessary.

The die head has two adjustments, fine and coarse. The fine adjustment is accomplished by means of an adjusting screw, D, in the face plate E. The circle about this screw is graduated into 10 parts and numbered 1 to 10. A part turn of this screw from one graduation to the next changes the cutting size of the die 0.001 in., and one complete turn of the screw changes cutting size 0.01 in. The circle surrounding the adjusting screw is also marked with arrows lettered "Small" and "Large," indicating the direction the screw is to be turned to decrease or increase the cutting size. The adjusting screw should not be used for adjustments of more than 0.02 in. over or under size.

The coarse adjustment giving the wider range of variation is effected by loosening the two square headed screws connecting the back F with the cam ring A, then turning the cam ring sufficiently to get the variation desired, being sure to tighten the square headed screws before using. Each space between consecutive graduation lines on the edge of the face plate E represents 0.005 in. in the cutting size of the die. New dies cut exact to size when the cam ring is set at zero and the adjusting screw D is two full turns below the surface of the face plate.

The chasers are backed by the large solid steel cam ring for a bearing; this bearing being directly opposite the cutting part of the chasers insures rigidity, accuracy and uniformity of size. The chasers are easily removed and changed. No readjustment is necessary when changing the various sizes of chasers fitting in the die head.

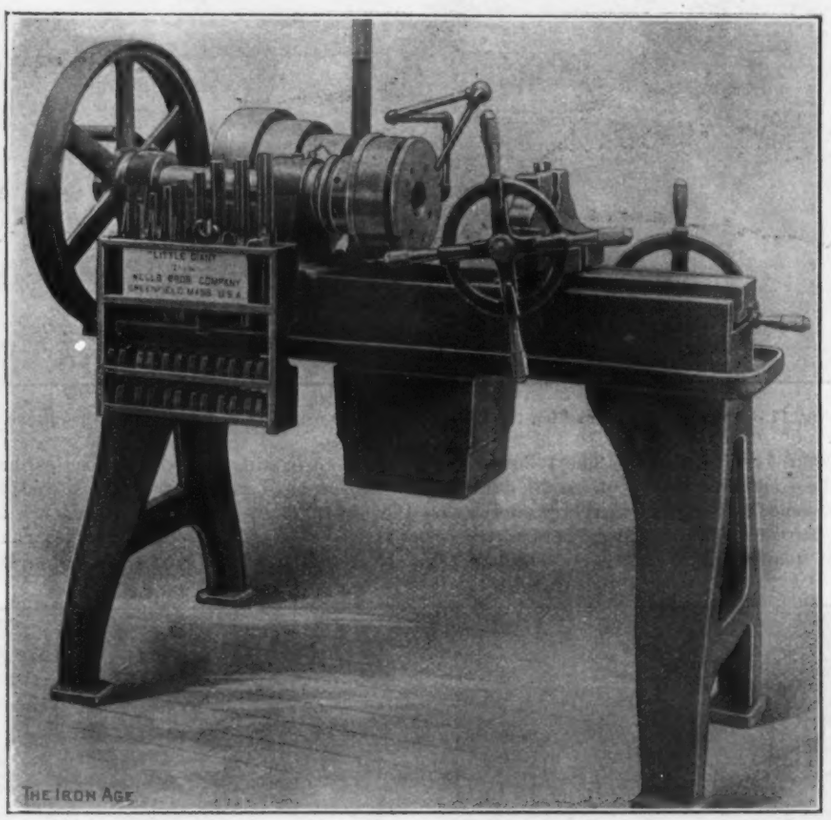


Fig. 1.—The Little Giant Opening Die Threading and Tapping Machine Built by the Wells Bros. Company, Greenfield, Mass.

They are readily sharpened and are made for long life and high speed. The taps are held in the die head by steel jaws with Vs, occupying the place of the chasers. The large taps are held by four jaws and the small taps by two. These jaws grip the taps firmly without marring or twisting them. The taps can be removed for unloading the threaded nuts and again replaced in the die head without stopping the machine.

To the left in Fig. 4 are shown the die lands as used in the die head, and to the right the tap jaws for holding taps. An iron rack is fastened to each machine just below the headstock for holding the dies, taps, tap jaws and wrenches.

The machines have hollow spindles, permitting any length of threads to be cut. All parts are made interchangeable, including the boxes for the back shaft, which is an especially desirable feature. Each machine is supplied with an exceptionally large and powerful oil pump and a good sized and convenient oil tank with a strainer.

The vises on these machines are strong and hold the work centrally and tightly. Two or more sets of steel jaws for holding bolts, pipe and nuts are furnished. These are interchangeable as well as replaceable. The

machine is furnished with the hand opening die head and one set of dies and machine nut taps for all of the standard sizes from ¼ to 1½ in.

Collapsing Pressures of Small Tubes.—Bulletin No. 5 of the University of Illinois Engineering Experiment Station is devoted to a paper by Albert T. Carman on "Resistance of Tubes to Collapse." Details are given of a series of experiments on steel boiler tubes of 1.5 to 3 in. in diameter, both lap welded and cold drawn seamless. Similar tests were made also on a set of brass tubes of the above range of size. It is stated that the experiments carried on by Professor Carman and his assistant professor of physics, Maurice L. Carr, supplement the data presented by Prof. R. T. Stewart before the American Society of Mechanical Engineers at the Chattanooga meeting May 1 to 4, 1906, under the title, "Collapsing Pressures of Bessemer Steel Lap Welded Tubes." An abstract of this paper, which dealt with tubes 3 to 10 in. in diameter, was published in *The Iron Age* of May 3, 1906, page 1472. The method of experimenting was substantially the same in the two cases. One of the conclusions drawn by Professor Carman is that the portion of a long tube affected by collapse from hydraulic pressure is generally not longer than 12 times the diameter, and that for greater lengths the collapsing pressure is independent of the length. It is said that the law according to which the collapsing pressure varies inversely as the length applies only to short tubes, or tubes shorter than a certain "critical minimum length," which in most cases is from four to six times the diameter.

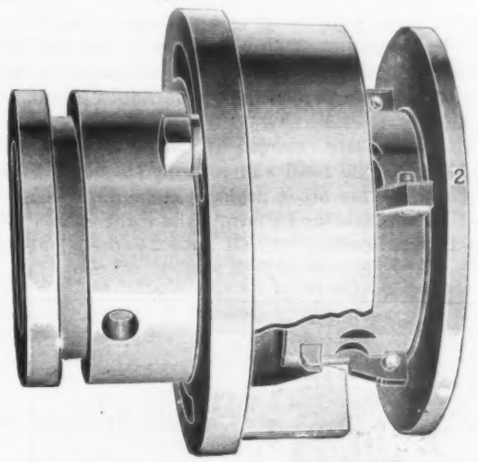


Fig. 2.—The Die Head in Open Position.

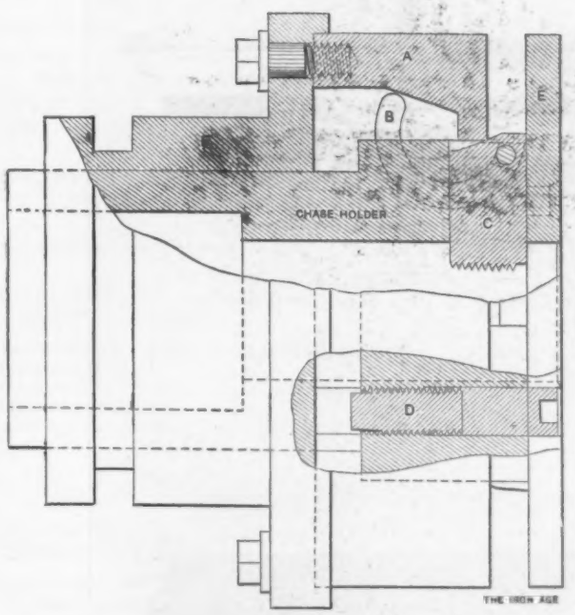
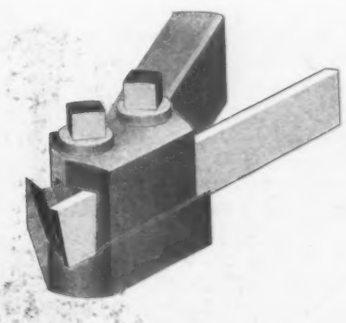


Fig. 3.—The Die Head in Closed Position.

A New Western Lathe Tool.

A new style of lathe tool holder, known as a two-way offset cutting off tool, which combines a right and left hand tool in one, has recently been placed on the market by the Western Tool & Mfg. Company, Springfield, Ohio, and is herewith illustrated. To change the holder from a right to a left hand tool, all that is necessary is to loosen the two set screws at the top, remove the blade, and shift the top clamping piece and tool over to the other side in the groove or slot there provided for it. The double bevel of the steel holder leaves an ample clearance on each side of the cutter. The cutter being supported on all sides, the strain is distributed equally to all parts of the holder, so that the cutter will stand a very heavy cut without breaking. It is claimed that this is the most powerful cutting off tool made. The holder is of the best steel, drop forged, thoroughly case hardened, and should be capable of a long continued service.



The Two-Way Offset Cutting-Off Tool Made by the Western Tool & Mfg. Company, Springfield, Ohio.

Early boilers in seagoing vessels were of what has been called the box type—that is, the boiler was a cubical box with a thin shell, the real strength being furnished by braces running in three directions. When the surface condenser made higher pressures possible, it was soon found that the multiplicity of braces made an untenable condition of affairs, and this led to the design of the cylindrical boiler, of which the shell is self bracing, the only special braces required being those for the heads and other flat surfaces. So well has this boiler stood the test of time that it is to-day in almost universal use. At one time an elliptical boiler was tried, the idea being to save room, but it was found unsatisfactory, and, after a few examples had been built and tested, it was abandoned.

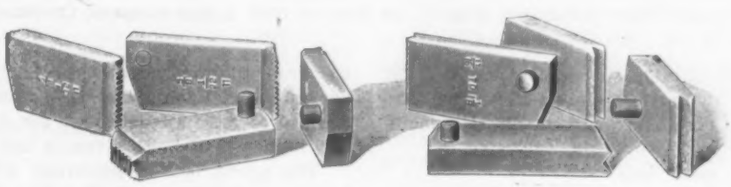


Fig. 4.—The Die Lands and Tap Jaws.

A New Bickford Radial Drill.

One of the principal features of the remodeled line of plain radial drills just brought out by the Bickford Drill & Tool Company, Cincinnati, Ohio, is the large number of speeds with which they are provided. The speeds vary with the size of the tool. On the 6-ft. radial the minimum speed is adapted to driving a 6-in. pipe tap, and on the 5 and 4 ft. machines the minimum speeds are proportioned for 5 and 4 in. pipe taps respectively. The illustration shows the 4-ft. machine and is representative of the three sizes made. The range, however, is identical on them all—*i. e.*, the maximum speed on each is 13.63 times the minimum speed, the only difference being that each series starts from a different figure.

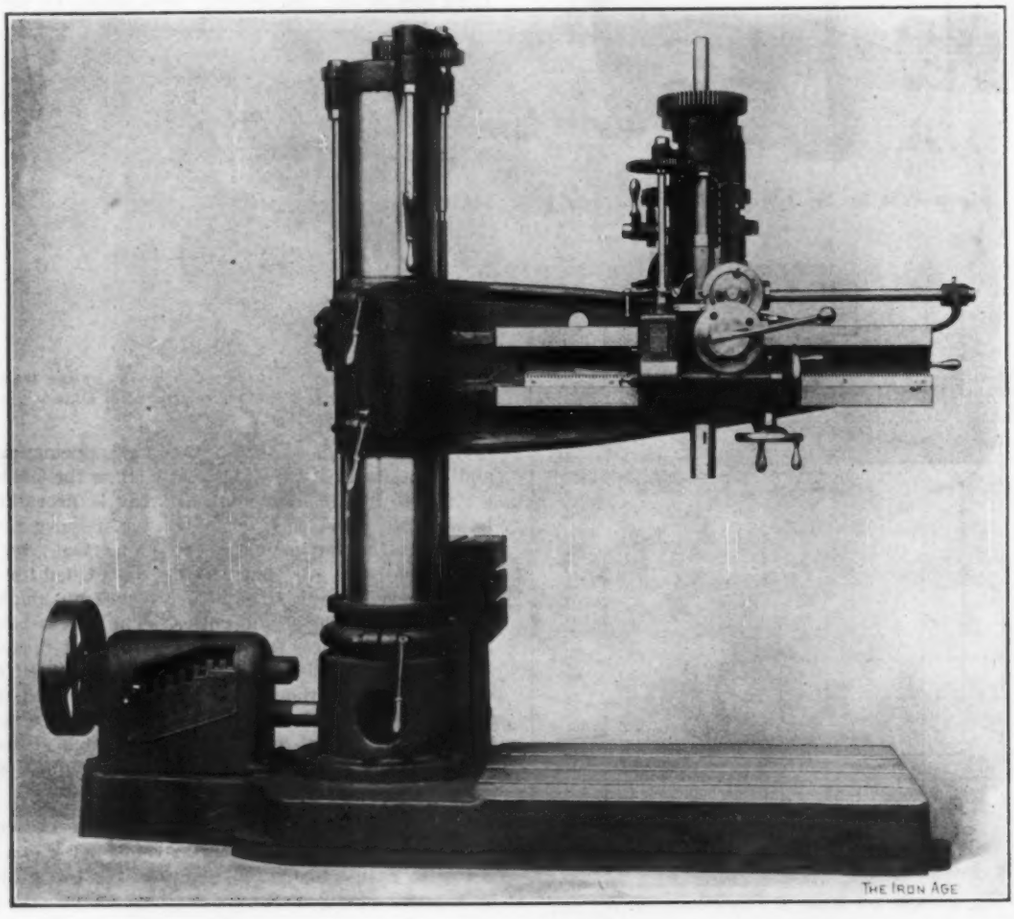
The speeds on the 4-ft. radial range from 22.5 to 307 rev. per min., as shown in the following table, in which it will be noticed that suitable speeds are provided for drilling all diameters, advancing by sixteenths from 7-16 to ⅞ in., inclusive, by eighths from ⅞ to 2¼ in., inclusive, and by fourths from 2¼ to 3½ in., inclusive.

Speed Table.

Number revolutions per minute made by spindle.	Diameter of drills for which speeds are suitable.	Actual number of feet per minute at which drilling is done.	Theoretical number of feet per minute at which drilling should be done.
306.7	7/16	35.13	35.35
268.8	½	35.18	35.00
238.5	9/16	35.10	34.65
214.7	⅝	35.13	34.30
195.2	11/16	35.30	33.95
174.1	¾	34.20	33.60
156.1	13/16	33.20	33.25
143.4	⅞	32.85	32.90
121.2	1	31.73	32.20
106.2	1⅛	31.28	31.50
94.2	1¼	30.83	30.80
84.8	1⅜	30.53	30.10
77.1	1½	30.28	29.40
68.8	1⅝	29.27	28.70
62.1	1¾	28.45	28.00
56.6	1⅞	27.78	27.30
48 2	2	25.24	26.60
42.2	2⅛	23.48	25.90
37.5	2¼	22.09	25.20
33.6	2½	21.99	23.80
30.7	2¾	22.10	22.40
27.4	3	21.52	21.00
24.7	3¼	21.03	21.00
22.5	3½	20.63	21.00

This large number of speed changes adapts the machine to metals of all degrees of hardness, as the steps are so gradual that it is never necessary to run the spindle at a speed much under the limit of endurance of the drill.

The speeds are changed by two levers, one of which is located on the head and controls the three back gear speeds, while the other projects from the speed box, located on the base and controls the eight speeds afforded through that mechanism. Of these 24 speeds only one varies from the theoretically correct by so much as 3.11 ft. per minute. Each speed is instantly available, and is claimed to have ample power for drilling from the solid the diameters of holes given in the table.



The Redesigned Plain Radial Drill Built by the Bickford Drill & Tool Company, Cincinnati, Ohio.

The speed box is patterned after one brought out by the same company the forepart of last year, a description of which appeared in *The Iron Age* November 16, 1905. The eight speeds which it affords are obtained from 12 gears, only three of which are in service at a time, reducing wear to a minimum. So far as appearance and the positiveness of its speeds are concerned the mechanism may be said to belong to the tumbler gear variety of speed change device, but inasmuch as the maximum difference in the periphery speed of its gears is confined to the comparatively narrow limit of 2 to 1 such shock as occurs at the moment of changing from one speed to another is nearly or wholly absorbed by the driving belt.

The feeding mechanism furnishes eight rates of feed, ranging in geometrical progression from 0.007 to 0.064 in. per revolution of spindle, each of which is instantly

available by use of a dive key. The tapping mechanism is located on the head and permits the backing out of taps at any of the machine's regular speeds, regardless of the speed used in driving them in. It is fitted with a friction clutch operated by a lever, the handle of which extends around under the arm within convenient reach of the operator and is used for starting, stopping and reversing the spindle.

The depth gauge answers a double purpose. Besides enabling the operator to read all depths from zero, which does away with the usual delays incident to scaling or calipering, it supplies a convenient means for setting the automatic trip, the graduations showing exactly where each dog should be located in order to disengage the feed at the desired points.

The automatic trip operates at as many different points as there are depths to be drilled at one setting of the work. In addition, it leaves the spindle free, after any intermediate tripping, to be advanced, or raised and advanced, or traversed its full length without disturbing the setting of the dogs; it also throws out the feed when the spindle reaches its limit of movement.

The Crucible Steel Company of America.

The report of the Crucible Steel Company of America for the fiscal year ended August 31, 1906, shows a surplus for the year of $1,376,313.72, after the payment of four dividends aggregating 5½ per cent. on the preferred stock. The company, however, paid off $1,317,000 collateral trust bonds and $171,932.56 mortgage on land at Clairton, Pa., thus absorbing more than the year's surplus in that way. The balance sheet as of August 31, 1906, is as follows:

Assets.

Real estate, plant and equipment	$44,222,070.20	
Deduct land at Clairton sold	207,036.15	
	$44,015,034.05	
Add additions and improvements	510,822.94	
	$44,525,856.99	
Deduct Park Steel Company stock outstanding (par value)	215,300.00	
		$44,310,556.99
Taxes, insurance, &c., paid in advance		49,089.97
Investments		112,035.00
Inventories	$6,087,307.57	
Bills receivable	39,478.23	
Accounts receivable	1,998,459.71	
Cash	628,710.18	
		8,753,955.69
Total		$53,225,637.65

Liabilities.

Preferred stock	$24,436,500.00	
Common stock	24,578,400.00	
		$49,014,900.00
Bonded debt held by public		250,000.00
Purchase mortgages on properties acquired during the year		200,000.00
Bills payable		1,095,017.34
Accounts payable		892,532.72
Accrued interest		26,047.26
Preferred stock dividend No. 16, payable September 29, 1906		366,547.50
Insurance fund		4,279.11
Surplus as of August 31, 1905	$68,480.70	
Net earnings for the year ended August 31, 1906	$2,901,840.52	
Deduct amount written off in the revision of certain inventory values, &c.	250,000.00	
	2,651,840.52	
Total	$2,720,321.22	
Deduct dividends on preferred stock, 5½ per cent.	1,344,007.50	
Undivided surplus August 31, 1906		1,376,313.72
Total		$53,225,637.65

Following is an abstract of the report made by Wm. G. Park, chairman of the Executive Committee, and Frank B. Smith, president:

"The net earnings for the year, after deducting all expenditures for repairs, interest on bonds and mortgages, etc., were $2,901,840.52, being $834,349.88 in excess of the earnings of the previous year. The total undivided surplus at the end of the fiscal year was $1,376,313.72. The company has paid to the preferred stockholders out of the earnings of the past year four dividends aggregating 5½ per cent., amounting to $1,344,007.50.

"During the year the company has been relieved of the mortgage of $171,932.56, shown on the balance sheet of August 31, 1905, by the Clairton Steel Company having consummated its agreement to purchase the land owned by the company at Clairton, Pa. However, since the last annual report, the company has purchased about 3 acres of land near its Crescent Works, Pittsburgh, for a railroad spring factory, and about the same amount of land between Thirty-sixth and Thirty-eighth streets, Pittsburgh, on which to make needed additions and improvements to its Park Works, but instead of paying the full price in cash it was deemed best to give purchase money mortgages at 5 per cent. on both properties for $100,000 each, payable in five years, with the option of anticipating payment.

"At the close of the fiscal year ended August 31, 1905, the bonded debt and mortgages on the company's property amounted to $1,738,932.56. At the close of the year ended August 31, 1906, this indebtedness was $450,000, composed of $250,000 collateral trust bonds and $200,000 of purchase money mortgages, referred to above, being a reduction during the year of $1,288,932.56. Since the close of the fiscal year the remainder of the outstanding bonds, amounting to $250,000, has been purchased by the company, and it now has in its treasury the entire issue of $5,000,000, except $872,000, which is used as collateral for the $872,000 bills payable which appears on the balance sheet. Bonds amounting to $213,000 have been canceled. The certificates for the trust stock shown on the last balance sheet, viz., preferred $563,500, common $421,600, have been canceled.

"The number of stockholders as of August 31, 1906, was—preferred, 3208, common, 1256, total, 4464. At the date of the last annual report the company still owned fifty of the 10-60 year 5 per cent. bonds of the United States Steel Corporation, which were carried in the balance sheet at 96. These bonds have been sold during the year at a profit and the proceeds used for general business purposes. In continuation of its policy the company has during the year purchased $1800 of the preferred stock of the Park Steel Company, leaving outstanding stock to the amount of $215,300 par value.

"The physical condition of the company's plants has been fully maintained out of operating expenses; consequently no charge for depreciation has been made.

"The suit of the Union Trust Company of Pittsburgh against this company for its compensation as a receiver of the Clairton Steel Company is still pending and no provision has been made in the balance sheet to cover this claim. The company has charged off the sum of $250,000.00 in the revision of certain inventory values and for claims applicable to prior years, which have been settled and paid during the year ended August 31, 1906.

"The tonnage output of the company for the fiscal year ended August 31, 1906, was greater than for the preceding year. The orders and contracts now on the books are much larger than at the corresponding time a year ago, indicating that if the present conditions continue the business for the coming year should be considerably greater, resulting in increased earnings to the company."

Alloys of manganese and silicon with a small percentage of iron are being much used as deoxidizers in the manufacture of steel. There is an objection to any alloy, if it is to be considered as a perfect deoxidizer, containing iron except to a very small extent. For this reason metallurgists have for some time been endeavoring to produce an alloy containing an extremely low percentage of iron and carbon with proportions of silicon and manganese as nearly as possible 30 per cent. silicon and 70 per cent. manganese. George G. Blackwell, Sons & Co., Limited, Liverpool, England, advise us that they have now succeeded in producing such an alloy, containing less than one-half of 1 per cent. of carbon and of extreme purity. They are prepared to supply this alloy in any quantity.

Industrial Alcohol Regulations.

WASHINGTON, D. C., October 9, 1906.—The Commissioner of Internal Revenue has promulgated the regulations for the enforcement of the new law providing for the use of alcohol free of tax for industrial purposes, which takes effect January 1 next. While elaborate and voluminous they provide a comparatively simple method of procedure.

Two Classes of Denatured Alcohol.

For the purpose of regulation denatured alcohol will be divided into two distinct classes: 1, That which is methylated by the addition of wood alcohol and benzine and which is to be known as completely denatured; and, 2, that which is denatured with special agents suited to the industries in which the spirits are employed and which will be known as partially or specially denatured alcohol. It is assumed that by far the greater proportion of the consumption of denatured alcohol will be of the completely denatured type, as it is this variety that will be employed for heat, light and power purposes and for every industrial use to which it can be put.

Under the regulations distillers of grain or ethyl alcohol will be permitted to denature it before its removal from bonded warehouse, after which it can be withdrawn without the payment of internal revenue tax. The general denaturing agent will consist of methyl alcohol and benzine in the following proportions: To every 100 parts by volume of ethyl alcohol of the desired proof (not less than 180 degrees) there shall be added 10 parts by volume of approved methyl alcohol and one-half of 1 part by volume of approved benzine; for example, to every 100 gal. of ethyl alcohol (of not less than 180 degrees proof) there shall be added 10 gal. of approved methyl alcohol and ½ gal. of approved benzine. Alcohol thus denatured will be classed as completely denatured. Methyl alcohol and benzine intended for use as denaturants must be submitted for chemical test and must conform to certain chemical specifications which the Internal Revenue Bureau has not yet prescribed.

Completely denatured alcohol may be withdrawn from bonded warehouse free of tax either by a manufacturer or general consumer or a wholesale or retail dealer therein. If a manufacturer uses less than an average of 50 gal. of denatured alcohol per month he will not be required to secure a permit, but if he consumes more than that amount he will be required to obtain a permit from the Collector of Internal Revenue for the district in which his plant is located. This provision is designed not to place a restriction upon the manufacturer but merely to enable the Internal Revenue Service to trace large quantities of alcohol and to exercise such general supervision as is calculated to prevent improper use of denatured spirits, and especially its illicit purification.

Unrestricted Use of Completely Denatured Alcohol.

Under the terms of the regulations alcohol intended for heat, light or power purposes is not subject even to the slight restriction imposed upon its use for manufacturing purposes. For example, any one desiring to use completely denatured alcohol for an internal combustion engine may buy it in any desired quantity. Dealers who sell less than 5 gal. are to be classed as retailers and those selling more than that amount are to be rated as wholesalers. Denatured alcohol cannot be sold in quantities of 5 gal. or more except in the original stamped packages. For the purpose of tracing large quantities of denatured alcohol wholesalers are required to keep records showing the quantities purchased and the source thereof and the names and addresses of the parties to whom they may sell. Retailers are required to record only the quantities and source of the spirits purchased. Consumers of completely denatured spirits, whether manufacturers or otherwise, are not required to keep any records, but they are obliged to afford every facility to revenue officers whose duty it may be at any time to make investigations.

Specially Denatured Alcohol.

As the agents adopted for use in complete denaturation render the alcohol denatured unfit for use in many industries in which ethyl alcohol withdrawn free of tax can be profitably employed, the Commissioner of Internal Revenue, in order to give full scope to the operation of the law, will authorize the use of special denaturants when absolutely necessary. The regulations covering the use of specially denatured alcohol are much more strict than those relating to completely denatured spirits, for the obvious reason that mixtures in which special denaturants are employed are much more easily purified.

Manufacturers desiring to use specially or incompletely denatured alcohol in their business must make application to the Collector of Internal Revenue of the district in which the business is located. A room or building must be prepared and set aside in which to store the specially denatured alcohol and may be used for no other purpose. If the application is approved the manufacturer will be notified and will then file with the Collector a bond, the penal sum of which shall be the amount of the tax on the estimated quantity of specially denatured alcohol that the manufacturer will use during the year the bond is intended to cover. A manufacturer using specially denatured alcohol will be required to keep a record of all spirits received, together with other details prescribed by forms to be supplied by the Commissioner of Internal Revenue. The requirements are in most respects identical with those imposed by the internal revenue laws and regulations for the government of the cigar and tobacco trade, and practice has demonstrated that they are neither drastic nor irksome.

Recovery and Reuse of Alcohol.

An important feature of the regulations provides for the recovery and reuse of alcohol. In many lines of industry, especially where alcohol is used as a solvent for lacquers, japans, varnishes, &c., it has been found practicable to recover the spirits driven off when the products are dried or baked. This is usually done by means of a simple condensing worm attached to the ovens. The spirits thus recovered will usually be found to be of less than standard strength and to contain less than the required amount of denaturing material. The regulations provide that such recovered alcohol may be transported to a special warehouse, and there concentrated and redenatured so as to conform to the official formula, after which it may be returned to the manufacturer and reused under the same conditions that cover the use of new alcohol. Manufacturers who recover alcohol will not be required to have it redenatured if it contains a sufficient quantity of the original denaturants to prevent its use as a beverage. If necessary this may be determined by the chemical examination of samples taken for this purpose and forwarded to the nearest laboratory.

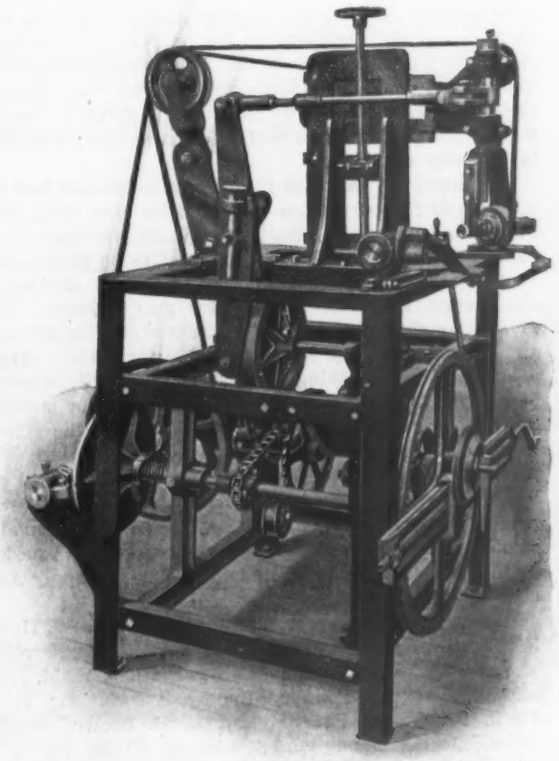
Additional Denaturants for Power Purposes.

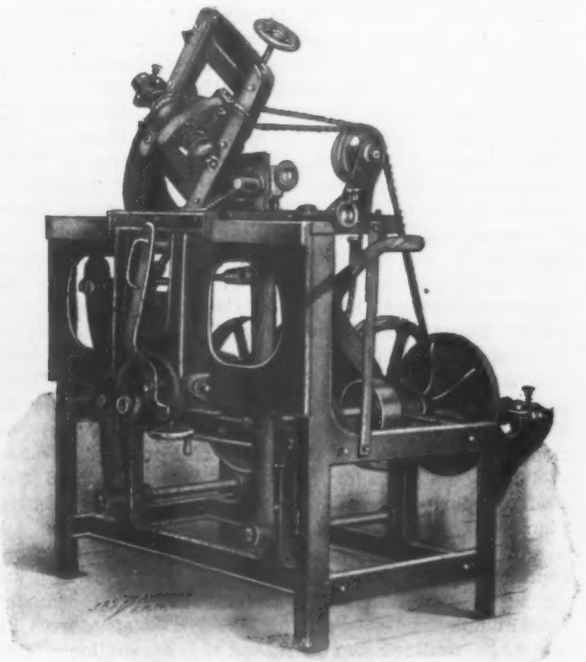
It is altogether probable that the Commissioner of Internal Revenue will authorize an additional formula for completely denatured alcohol for use in internal combustion engines. The investigation of European practice made by Commissioner Yerkes and Dr. Crampton, chief chemist of the bureau, showed that when used for power purposes abroad denatured alcohol was enriched by the addition of varying percentages of a petroleum distillate of substantially the same characteristics as commercial benzine. The regulations which the Commissioner has just established do not permit consumers of denatured spirits to add to or take from them anything whatever, and therefore it would not be practicable to add benzine without special authority from the Internal Revenue Bureau. The Commissioner, however, is prepared to consider any formulas that may be submitted in this connection and if he is satisfied that they will produce an article that may be safely classified as completely denatured he will apply the appropriate regulations thereto. The experts of the bureau recognize the fact that completely denatured spirits for power purposes must be relieved of all restrictions if they are to compete with gasoline and other petroleum products; therefore if special formulas for completely denatured spirits are approved such spirits will be permitted to be used without any restrictions except those that apply to alcohol completely denatured with the general agent prescribed by the regulations. W. L. C.

The Hanchett Automatic Saw Sharpener.

For sharpening band saws and rip and cross-cut circular saws a new automatic saw sharpener which is a departure from machines of its class is now manufactured by the Hanchett Swage Works, Big Rapids, Mich. The features in this machine, which are different from those in former automatic saw sharpeners, are such as will appeal to the filer and to the mill man, because they adapt it in the best manner to the work for which it is intended. The builder of these sharpeners also manufactures the Hanchett saw swage, which is said to be in use in 75 per cent. of the sawmills of the United States and Canada. For a number of years past, while manufacturing saw swages, the company has given the fileroom careful study and offers to the users of saws complete equipment for the care of band, gang and circular saws.

The inventor of the Hanchett saw sharpener is a practical machinist as well as an expert filer, who has spent the greater part of 20 years in the filerooms of large sawmills and is hence acquainted with their needs. The new sharpener is particularly noteworthy for its simplicity, durability and usefulness.





Two Views of the New Automatic Saw Sharpener Manufactured by the Hanchett Swage Works, Big Rapids, Mich.

It is interesting to follow its development in the endeavor to remove the difficulties usually encountered by a filer. In the first place it was found necessary to overcome the vibration of the sharpener while in operation, in order to secure a uniformly ground tooth. This was accomplished by eliminating pulleys and brackets on the top of the machine and having the emery wheel driven direct from the countershaft by a three-ply hand screwed V-shaped rawhide belt running over two-step deep grooved sheaves with an adjustable tightener.

With the old line of sharpeners a different cam was required for each style of tooth. This not only necessitated quite a supply of cams, but imposed the making of a change every time a saw was used having a different style of teeth. By using an adjustable cam this complication has been simplified, only one being now necessary, and that one adjustable for any shape of tooth.

The back feed problem, which has been a source of trouble to the filers ever since automatic filers were invented, has been solved by using a new back feed adjustment which acts in conjunction with the front feed lever and does away with the connecting shaft and the long upright feed arm as used on the old style of sharpeners. With it a positive uniform feed is always maintained. The feed finger is fitted with a simple attachment which takes up the wear on the finger when necessary. By means of a friction and disk the emery wheel may be run at any speed desired.

The Simonds Mfg. Company has recently secured the agency for the entire line of Hanchett machinery for the territory covered by its New Orleans, La., house, as well as for all of the Pacific Coast.

An Iron Industry in New Zealand.—Some details have been published in the English press of the project for establishing iron and steel manufacture in New Zealand. It is stated that at Para Para, near Nelson, a body of iron ore is found, analysis showing 56 per cent. of iron and 0.041 phosphorus. Open pit mining is possible and several million tons are in sight. J. H. Witheford is reputed to have in hand the project. He states that the Government of New Zealand has guaranteed to him a bonus at the rate of £20,000, to be paid on the production of 20,000 tons of manufactured iron and steel. In addition, it is stated that the Government has given an order for 75,000 tons of steel at ruling English free on board prices, plus the amount of the freight to New Zealand, and that the New Zealand Government will take 24,000 tons of steel rails annually for a period at English ruling prices, allowing a freight bonus of £1 per ton. Coal, limestone and fire clay are said to exist in large quantities in the immediate vicinity of the iron fields. The condition of the Government guarantees is that the company undertaking iron manufacture have a capital of not less than £200,000, of which £100,00 is to be expended in acquiring lands, erecting buildings and the necessary plant and appliances; further, that the iron and steel shall be manufactured from magnetic or titaniferous iron sand or iron ore, which, together with all materials, fuel and fluxes, shall be the product of New Zealand.

The exports of steel rails from Belgium in the first eight months of this year amounted to 108,044 tons. In the corresponding period of 1905 they were 82,622 tons.

The Philadelphia Foundrymen's Association.

The one hundred and sixtieth meeting of the Philadelphia Foundrymen's Association, held in that city Wednesday evening, October 3, was one of the most important that has been held for some time. President W. H. Mcfadden and Secretary Dr. Richard Moldenke of the American Foundrymen's Association, Secretary H. M. Lane of the Foundry Supply Association, and H. E. Field, Pittsburgh, Pa., were among those present.

President Devlin called the meeting to order at the usual hour. The usual reports were presented. The condition of the association from the treasurer's report showed a balance on hand amounting to over $2275. The Harlan & Hollingsworth Corporation, represented by James S. Stirling, made application for membership and was unanimously elected.

The following committee, which will have general charge of the arrangements for the annual convention of the American Foundrymen's Association and its allied organizations, to be held in Philadelphia from May 20 to May 25, 1907, was then announced by President Devlin: Dr. E. E. Brown of E. E. Brown & Co., chairman; A. E. Outerbridge, Jr., Wm. Sellers & Co.; S. G. Flagg, Jr., S. G. Flagg & Co.; C. S. Asbury, Enterprise Mfg. Company; J. M. Jaycox, Ernest Law & Co.; W. S. Hallowell, Harrison Safety Boiler Works; George C. Davies, Pilling & Crane; W. O. Steele, Bateman Mfg. Company; George R. Sullivan, Rogers, Brown & Co.; E. H. Mumford, E. H. Mumford Company; Thomas Evans, Eynon-Evans Mfg. Company; Edgar S. Cook, Warwick Iron & Steel Company; J. H. Sheeler, Sheeler-Hempsher Company; George C. Davis, Cyrus Borgner, Cyrus Borgner Company; A. A. Miller, *The Iron Age;* W. H. Ridgway, C. Ridgway & Son Company; W. W. Hearne, Matthew Addy & Co.; Josiah Thompson, J. Thompson & Co.; H. O. Evans, Thomas Devlin Mfg. Company; Frank Krug, Joseph Dixon Crucible Company; W. H. Taylor, George V. Cresson Company. As ex-officio members, President Thomas Devlin, representing Thomas Devlin Mfg. Company, and Secretary Howard Evans, representing the J. W. Paxson Company. This committee will act in conjunction with the officers of the American Foundrymen's Association, the Foundry Foremen's Association and the Foundry Supply Association in perfecting the various plans for the conventions.

A general discussion of matters pertaining to the reception of the members and guests of the various associations followed. W. H. McFadden, president of the American Foundrymen's Association, made a brief address in which he outlined the policy of the association. The attendance at the convention he estimated at 1000 members and guests, and said that every effort would be put forward to make the coming convention the banner one of the association. He asked the support of the trade journals and the public press in general, and pleaded for a closer relationship between the American and the local associations. H. M. Lane, secretary of the Foundry Supply Association, promised the active support of that association in connection with the convention. The affiliation of his organization he thought was important to the success of the convention. The educational value of the exhibits was great, and in this age of specialization and advancement it was the medium of promoting the interest and aiding the foundryman by bringing to his attention the various new methods and products for use in foundry practice. The Foundry Supply Association had, he said, secured the Second Regiment Armory for holding its exhibition. Ample floor space, both under cover and in the open, would be provided for exhibitors, and it was thought that the exhibition, judging from inquiries already received, would be the largest ever held. Dr. Moldenke, secretary of the American Foundrymen's Association, spoke on the work of that association and its value to its members. At the coming convention he said the papers presented would be of exceptional value. He particularly urged that every foundryman not already a member affiliate with the American Association.

Several members of the General Committee spoke on the plans for the entertainment of the members and guests of the association during the convention. A number of special features are under consideration, such as visits to various plants, a river trip and shad dinner, smoker and general reception. Plans for the entertainment of the ladies in attendance at the convention will be considered, and every effort will be made to make the social feature of the convention one of particular interest.

The paper before the association for the evening was on the subject of a flat gray iron casting like stove plate, that was chilled in the center and gray in the other portions. This was illustrated by drawings shown with the lantern and by a number of samples. The paper and the discussion are printed elsewhere in this issue.

Foundrymen Preparing for the Philadelphia Convention.

A meeting of representatives of the American Foundrymen's Association and the Executive Board of the Philadelphia Foundrymen's Association, with H. M. Lane, secretary of the Foundry Supply Association, was held in Philadelphia, October 3. Its purpose was to make plans for the reception of the American Foundrymen's Association and its allied organizations, the Foundry Foremen's Association and the recently formed Foundry Supply Association, who will meet in annual convention in that city next year.

A general discussion of the arrangements was had and the date of the convention was fixed for May 20-25, 1907. The Foundry Supply Association, which will have in its charge the direction of the exhibition to be held in connection with the convention, has practically decided on the Second Regiment Armory for that purpose. This gives a floor space of 168 x 198 ft. for exhibition purposes and adjacent outdoor space available for certain classes of exhibits which owing to insurance restrictions cannot be held in the armory. A number of rooms for meetings are also provided in the armory. Plans for the general meeting of the association for headquarters and other matters pertaining to the convention were discussed and left for further action to a general committee, to be appointed by the president of the Philadelphia Foundrymen's Association, with which the officers of the American Foundrymen's Association and the Foundry Supply Association will co-operate.

Those in attendance at the conference were W. H. McFadden, president, and Dr. Richard Moldenke, secretary of the American Foundrymen's Association; H. M. Lane, secretary of the Foundry Supply Association; H. E. Field, Pittsburgh, Pa., and Dr. E. E. Brown, Howard Evans, Josiah Thompson, Stanley G. Flagg, Jr., A. E. Outerbridge, Jr., George C. Davies, H. O. Evans and George C. Davis, all of Philadelphia.

American Armor Plate in Italy.—The proposal is under consideration by the Italian naval authorities to admit foreign armor plate in competition with the product of the Terni Iron & Steel Works Company, which has had the exclusive patronage of the Italian Government for a number of years. The agitation for outside competition is said to be due to the fact that the Naval Testing Committee accepted plates from the Terni Company which were not up to the standard of resistance to projectiles. Trials of plates of the Midvale Steel Company, Philadelphia, have recently taken place on the royal proving ground at Muggiano, near Spezia. According to the London *Engineer* the tests of the American plates have yielded results not more favorable than those secured with Terni plates: "The former are lower in price; they are merely nominally so, as the American company is said to leave to the purchaser the obligation to pay the royalties on the transaction. However this may be, the admission of foreign plates for the purpose of trial in Italy is an interesting event, and although a wide difference exists between experiments and the actual placing of orders it may be regarded as a reminder to the Terni Company that its prices are high. Whether the hint has any effect or not remains to be seen."

A Peculiar Chilled Casting.*

BY GEORGE C. DAVIS, PHILADELPHIA.

The casting to which I am about to call your attention presents some unusual features. For this reason I wish to describe it, even though I have no theory as to its cause, nor am I able to give all the data. The accompanying illustrations, Figs. 1 to 4, all show parts of the same casting. As shown in Fig. 1 it varies in thickness from ⅛ to ½ in., and in places has a wedge shaped chill surrounded by gray iron on each side. A part of the casting, even in the light section, is gray without trace of chill, though it is hard. The analyses are given in the following table:

	A. Per cent.	B. Per cent.
Silicon	2.61	3.16
Sulphur	0.106	0.102
Phosphorus	0.60	0.74
Manganese	0.36	0.19
Graphitic carbon	3.40	0.25
Combined carbon		3.04

Owing to difficulty in sampling I am not able to present separate analyses of the gray and white portions. The figures given under A represent the casting illustrated in Fig. 1. The drillings were taken as near as possible to the chilled part. Sample B was taken at the foundry and represents the white portion from several castings made at a later date than A.

Before proceeding with the discussion I will give the method of charging, so far as I can, as follows:

Diameter of cupola	43 in.
Bed of cupola, broken coal	400 lb.
Bed of cupola, coke	1,400 lb.
Smelting charge, pig iron	4,000 lb.
Smelting charge, sprues	2,000 lb.
Subsequent charges, coke	350 lb.
Subsequent charges, pig iron	1,600 lb.
Subsequent charges, sprues	1,200 lb.
Total melt, about	15 tons.

The first discussion I have been able to find on internally chilled castings is in Vol. 17, p. 700, of the *Transactions* of the American Institute of Mechanical Engineers. An analysis is given which is as follows:

	White inside. Per cent.	Gray outside. Per cent.
Silicon	2.74	2.85
Combined carbon	2.55	1.75
Graphitic carbon	1.31	1.87
Manganese	0.50	...

Phosphorus and sulphur are not given, but it is stated that no marked difference in these elements was found in the two samples. Internal chill is sometimes seen in pig iron and this was at first thought to be due to segregation of sulphur or manganese. So far as I know, this has never been proved, and the analyses I can recall show little difference between the gray and the white portions of the pig iron, except in the ratio of graphitic to combined carbon.

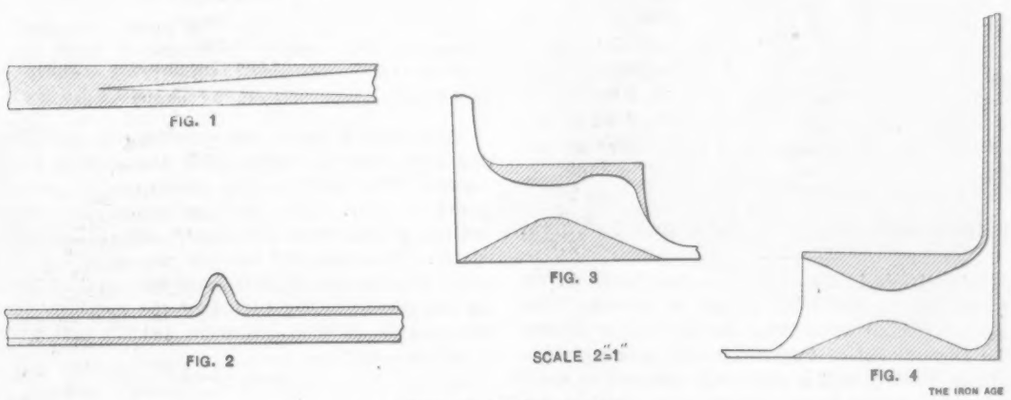
To return to the casting under discussion, the silicon in A is correct for light work and should give good results; sample B is too high in this element, and I should expect a weak iron but not a chill.

The sulphur in both cases is not excessive. In connection with this I would call your attention to the fact that while sulphur usually causes hard iron it does not always do so. I give in the table below two analyses of bad castings high in sulphur. These were water backs for ranges. They leaked under the hydraulic test, and when broken showed a porous fracture with reddish spongy spots; as indicated in the analyses both were soft iron, yet they contain more sulphur and less silicon than A. Another water back casting, first class in every respect, showed 0.096 per cent. sulphur, or nearly as much as sample A. I do not think there is any reason to attribute the chill to sulphur. Following are the analyses of the defective castings:

	Per cent.	Per cent.
Silicon	2.49	2.53
Sulphur	0.153	0.142
Phosphorus	0.68	0.73
Manganese	0.52	0.46
Graphitic carbon	2.94	2.63
Combined carbon	0.24	0.59

Returning to the analyses given at the beginning of this paper the phosphorus in both A and B is about as it should be; there is no reason to suppose it had anything to do with the chill.

The manganese evidently had nothing to do with the chill, as it is normal in A and low in B. The total carbon in A is correct for this class of work. In B it is a little low, as might be expected, owing to the high silicon, for in pig iron, as a rule, silicon increases and carbon decreases.



A Peculiar Chilled Casting.

It is believed by many that pig iron made from magnetic ore has peculiar chilling properties. In this case samples A and B were made from these brands of pig iron and sprues from previous heats. One brand is a Southern iron and the other two are local irons. Of the latter one was made from an ore mixture containing about 9 per cent. magnetite and the other 35 per cent. of "local ores," which were probably mostly magnetite. The mixed pig irons would only represent a small proportion made from magnetite, and I think we can safely dismiss this theory in this case.

Another theory held by many is that the cause is in the management of the cupola and pouring. I quote the views of a well-known furnaceman, who writes me as follows:

> I have noticed that this peculiar condition—gray on the exterior and white on the interior—oftentimes in very thin pieces of casting, is due more to the melting of the iron than to the chemical composition of the iron. It cannot occur, however, with low silicon iron. So far as my experience goes it is characteristic of the use of high silicon iron which has been melted in a cupola with a cold bottom, enabling the iron to take up sulphur, or the iron has been well melted and run into cold ladles, under which condition certain chemical changes take place, which have been remedied by melting the iron hotter, thus reducing the percentage of sulphur, and also in tapping the iron into hot ladles instead of moderately warm ladles.

Apparently the analyses presented in the first part of this paper give us no clew as to the cause. The theory which I have just quoted is a question for foundrymen

* Paper read before the Philadelphia Foundrymen's Association, October 3.

rather than chemists, so I leave the subject with those present for discussion.

Discussion.

In the discussion of this paper, H. E. Field said that he had had some experience in respect to such castings, but invariably in those of heavy section. In the case of a 9-in. chilled roll, in which the ends were drilled out to permit of the insertion of steel necks, it was found that the metal was apparently chilled in the center to the approximate size of ¾-in. diameter. This section of white iron was surrounded by about 4 in. of metal of the usual gray iron character, and this again by the face chill of approximately ⅝ in. He continued: "This was with a low silicon high carbon iron, and my theory in the matter has been that the expansion due to the formation of the graphitic carbon has been so great that the combined carbon in the center has, owing to the high pressure exerted, been unable to change from the combined form. The condition I believe is not a chemical but rather a physical one."

Dr. Richard Moldenke agreed with Mr. Field in this view and called attention to the frequent appearance of portions of white iron shown at times in pig iron, which was sometimes held to be due to sulphur, but which was found to contain no abnormal amount of that element. In almost each case examined this occurrence was noted in irons which were high in carbon, and no doubt the pressure exerted during the cooling of the iron by the expanding graphitic carbon was so great as to make it impossible for some of the combined carbon to change to graphitic. No theory, however, was offered that would throw any solution on castings of as light a section as described in Mr. Davis's paper, although it might be due in a measure to the same cause, but under varying conditions.

August Iron and Steel Exports and Imports.

Our foreign trade in iron and steel has lately shown rather wide fluctuations from month to month. The August figures just at hand from the Bureau of Statistics of the Department of Commerce and Labor show a heavy gain in exports and a decline in imports as compared with the previous month, whereas the reverse was the case with July. The total value of the exports of all kinds of iron and steel and manufactures thereof, not including ore, in August was $15,309,057, against $12,766,212 in July. The commodities for which quantities are given aggregated a total of 111,260 gross tons, against 98,409 tons in July, 107,585 tons in June, 136,592 tons in May, 120,015 tons in April, 138,679 tons in March, 97,719 tons in February, and 109,506 tons in January. Taking such commodities the following table gives the exports for August and for the eight months ending with August in 1906 and 1905:

Exports of Iron and Steel.

	August,		Eight months,	
	1906.	1905.	1906.	1905.
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	4,099	2,222	50,576	33,763
Scrap	1,113	508	8,268	4,792
Bar iron	4,632	2,248	37,801	22,237
Wire rods	1,202	171	5,553	3,635
Steel bars	3,158	1,335	19,673	13,899
Billets	15,936	19,961	162,439	126,624
Hoops and bands	778	359	2,989	1,960
Iron rails	....	....	....	....
Steel rails	28,720	34,874	232,072	190,068
Iron sheets and plates	1,921	850	8,565	4,342
Steel sheets and plates	8,402	5,635	60,485	41,935
Tin and terne plates	335	164	10,395	6,146
Structural iron and steel	11,896	4,464	74,606	50,004
Wire	14,106	10,845	112,449	89,855
Cut nails	1,254	642	5,354	5,663
Wire nails	3,136	3,296	34,355	25,189
All other nails, including tacks	406	412	3,230	2,849
Pipes and fittings	10,166	10,798	98,395	*
Totals	111,260	98,784	927,205	622,961

* Quantity not stated prior to July 1, 1905.

The largest single item in the above list is steel rails, in which a gain was made of about 5000 tons as compared with July. The next heaviest item is billets, which showed a falling off of about 1000 tons, but the third largest item, namely, wire, showed an increase of 4500 tons.

The total value of the imports of all kinds of iron and steel and manufactures thereof, not including ore, in August was $2,623,677, against $3,287,916 in July. The imports of commodities for which quantities are given show a falling off as compared with July of more than 18,600 tons. The total quantity was 34,112 gross tons against 52,715 tons in July, 41,038 tons in June, 45,706 tons in May, 37,920 tons in April, 50,167 tons in March, 28,407 tons in February, and 46,516 tons in January. The imports of such commodities for August and for the eight months ending with August in 1906 and 1905 were as follows:

Imports of Iron and Steel.

	August,		Eight months,	
	1906.	1905.	1906.	1905.
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	18,843	17,399	203,165	126,815
Scrap	342	353	10,303	8,269
Bar iron	3,129	3,803	23,576	22,946
Rails	3	1,969	2,522	11,867
Hoops and bands	2,677	537	9,880	1,811
Billets and steel in forms n.e.s	2,030	1,570	13,688	9,540
Sheets and plates	274	261	2,440	1,496
Tin and terne plates	2,816	9,597	31,944	50,329
Wire rods	1,552	2,183	12,202	11,330
Wire and articles made from	548	237	3,852	2,584
Structural iron and steel	1,898	1,600	24,852	4,663
Totals	34,112	39,509	338,424	251,650

The total value of the exports, not including ore, in the eight months ending with August was $113,299,535, against $90,768,479 in the corresponding period of the previous year. The total values of the imports, not including ore, were $21,544,688 and $17,411,628 respectively. The quantity of iron ore imported during the eight months was 737,660 gross tons against 588,526 tons in the corresponding period of the previous year, while the exports of iron ore were 184,973 tons and 131,944 tons respectively.

The York Rerolling Process in England.

A demonstration was given on September 17 of the York process of rolling old rails into structural shapes at the Cyclops Iron Works of Edward Le Bas & Co., at Milwall, England. The process was described by the patentee, James E. York, Brooklyn, N. Y., in a paper read at the joint meeting at London in July of the Iron and Steel Institute and the American Institute of Mining Engineers, and published in *The Iron Age* of July 26, page 207. It has been taken over by the York Transverse Rolling Process Company, Limited, of which Mr. York and Edward Le Bas are the directors, and model mills have been erected at Milwall. At the demonstration referred to a number of different sections were rolled from scrap material, and the work was generally successful. The company is now offering the use of its process to railroads and rolling mill companies.

Alexander W. Slocum, until recently superintendent of the National Car Wheel Company, Pittsburgh, has patented a method of increasing the hardness and toughness of cast iron car wheels by combining rutile or oxide of titanium with the cast iron. The addition is introduced into the metal after it has been drawn from the cupola into the ladle, about 1 per cent. of the rutile being placed in a paper box and pushed with a steel rod to the bottom of the ladle. It is afterward stirred so as to mix thoroughly with the iron. The inventor states that the discovery that titanius may be made to alloy with iron at temperatures at or below that at which it leaves the cupola greatly decreases the cost of such alloys and renders them commercially available in the casting of comparatively small articles.

A Carlin Gasoline Hoisting Engine.

A small, light, compact and durable hoisting engine of recent design, particularly intended for bricklayers in the erection of three and four story buildings, is shown in the accompanying illustration. Ease of handling and economic operation are the principal claims made for this outfit by the manufacturers, the Carlin Machinery & Supply Company, Allegheny, Pa. One machine of this type is operating on a four-story building with a cage handling two barrows, each containing 40 bricks.

The friction drum is of the standard type, with wood cone friction drum 9 in. in diameter, 12 in. long, which can be lagged to further increase the diameter to 14 in. A steel cut gear pinion on the crank shaft of the engine engages with a cut gear of larger diameter on the drum shaft. These gears are so proportioned that the double gearing found on so many machines of this class is not necessary, thereby simplifying and lessening the number of parts and wear. Gear guards protect the gears from becoming clogged with dirt and other foreign matter. A pedal operated steel band brake, with segmental wood lining, is provided for lowering the load. When it is desired to hold the load suspended a pawl engages with a shrouded tooth ratchet wheel bolted to the drum. The whole machine is mounted on a neat cast iron base, with levers conveniently placed for the operator.

The 5-hp. gasoline engine used for operating the hoist is especially adapted for its service. It is a horizontal four-cycle engine, built with a view to compactness, simplicity and accessibility of all parts. In this type of engine there is claimed to be less vibration than is found in the vertical type and being longer connected it is said to be more durable. A small feed pump attached to the engine delivers the gasoline into a glass cup at the mixing valve, which thus serves as a sight indicator. This mixing valve supplies the explosive vapor in amounts proportional to the work done, the surplus gasoline returning to the tank through an overflow. The gasoline is entirely inclosed, eliminating all danger from explosion. The machine is of high order, cylinder, piston ring, valve, &c., being accurately ground in, and cut gears used exclusively.

The cast iron cylinder water jacket is removable, making it easy of repair in case of freezing through neglect. A pendulum governor controls the speed, which can be regulated while the engine is running. Large wearing surfaces add materially to the life and reliable operation. The engine has a lifting capacity of 1000 lb. on a single line.

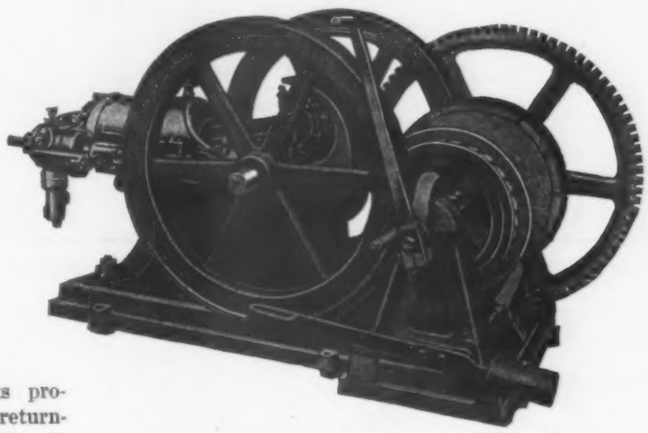
Gas attachments can be substituted for the gasoline when so desired. One machine, it is stated, is operating with natural gas, at a cost of 25 cents per day of eight hours. The operator was formerly a hod carrier.

Ekert High Resistance Steam Materials.

No better heat resisting material has ever been found than asbestos, and for that reason most attempts to make a steam packing material have involved the use of asbestos as one of the ingredients, if not the principal constituent. Asbestos by itself is not suitable for packing valves, rods, joints, &c., principally because of its friable and porous nature. Being porous, it has a strong tendency to absorb water, as a consequence of which decomposition speedily occurs. Condensed steam, starting at the exposed edges and surfaces, rapidly penetrates into the material, deteriorating any porous fiber packing or disk in a comparatively short time. The recently patented products of the Ekert High Resistance Materials Company, Dayton, Ohio, are produced by a special dry process which makes them, it is claimed, absolutely nonporous. The materials are dense and, since they do not absorb water, they do not decompose like other asbestos packings. The materials have elasticity, a fibrous body and tensile strength and are essentially asbestos with the pores filled with a high resisting binding material. They are guaranteed to combine the greatest possible steam resistance, strength of body and durability with a high degree of elasticity, density and power of even expansion.

The materials are made in the form of valve disks, sheet packing and rod packing rings. The disks are stated to readily assume the shape of the seat, to be always tight and not affected by the highest temperatures and pressures, to resist decomposition or cracking under the highest steam or mechanical pressure and to last as long as the valve. They are made in three grades, No. 1 for steam pressures up to 150 lb., No. 2 for steam pressures up to 450 lb. and No. 3, with solid nickel protection, for steam pressures from 450 to 1500 lb., or corresponding temperatures up to 900 degrees F. The No. 2 valve disk is stated to have withstood continuously 450 lb. steam pressure for over two years and to have withstood air pressure in tests which range up to 10,000 lb.

The steam packing for packing steam joints, &c., has the same claims as the disk and high elasticity combined with a certain degree of flexibility. Grades A and B are intended for packing any kind of a joint under any and all pressures of water, steam, acids, oils, &c., and can be placed in a joint that is either hot or cold. The thinnest packing is affirmed to give the greatest satisfaction even with rough joints, as it accommodates itself instantly to any uneven surface without the necessity of following up. Where a good coating of graphite or powdered soapstone is used in applying the sheet packing the same piece can be used repeatedly. The packing is made in sheets about 60 x 24 in., in 1-32, 1-16, 3-32 and ¼ in. thicknesses. Gaskets can be cut any size and shape desired. Grade C is for packing valve stems and bonnets. It is made in sheet form of any desired thickness and can be cut into strips or rings for this purpose. The grade A is for pressures in general use up to 200 lb.; grades B and C both for pressures up to 1000 lb., and any mechanical pressure and temperature of superheated steam. The piston rod packing rings of Ekert high resistance materials are furnished in ½-in. thickness of any dimensions.



A Small Gasoline Engine Hoisting Outfit Built by the Carlin Machinery & Supply Company, Allegheny, Pa.

In an article reviewing the possibilities of the Adirondack region in the way of power supply from water it is stated that the region has water capable of developing a continuous 200,000 hp. on its way to sea level. On the basis of 300 10-hour working days in the year this would be a sufficient flow to develop 500,000 hp., provided that suitable storage reservoirs were constructed to hold the water during idle periods. The author states that this power would be sufficient to carry the loads of every steam engine in the State of New York, if distributed electrically. This last statement is open to grave doubt.

The Commercial Club of Linton, Ind., has set out to get 12 factories in the next year and is open for negotiations with manufacturers.

The Improved Cincinnati Roll Bender Drive.

In most respects the machine illustrated is similar to the roll bender built by the same company, the Cincinnati Punch & Shear Company, Cincinnati, Ohio, and described in *The Iron Age* May 3, 1906. The exception is in the method of drive, whereby one motor running continuously in the same direction performs all of the offices, without the use of expensive and complicated controlling apparatus. The latter has been eliminated by substituting mechanical means of reversing and stopping and starting. Not the least of the advantages gained by this arrangement is that the motor, being never obliged to start under load, is subject to less heating, consequently will last longer and at the same time a smaller motor will do the work. Fig. 1 indicates the general appearance of the machine, but unfortunately shows the most interesting part in the background. In Fig. 2 the mechanical stop and start and reversing mechanism is better displayed.

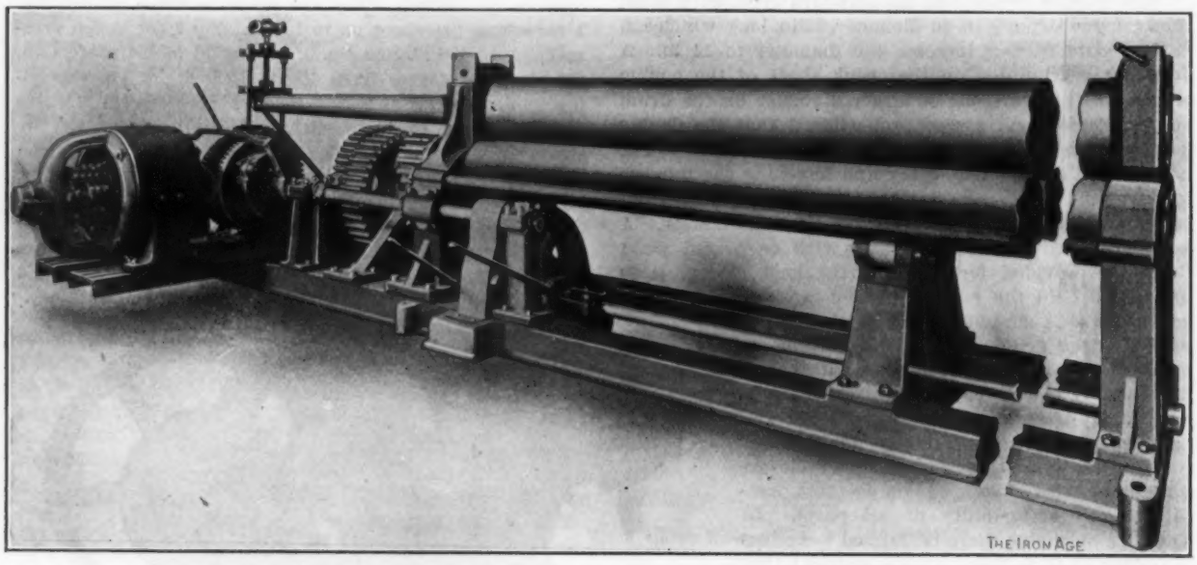


Fig. 1.—A Motor Driven Roll Bender with Mechanical Control Designed and Built by the Cincinnati Punch & Shear Company.

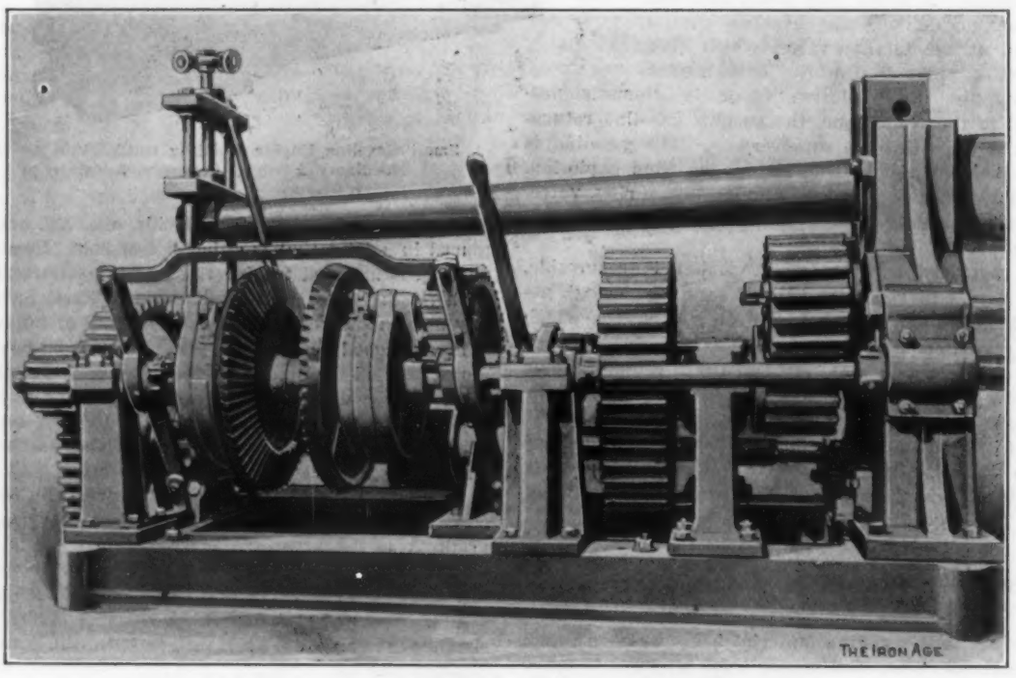


Fig. 2.—A Detail of the Driving End with the Motor Removed.

The reversing mechanism is merely a new application of an old device, its principal features being two Osterlein clutches. The fixed part of one clutch is connected with the gearing which drives the rolls in the forward direction and the fixed part of the other with the gearing which drives the rolls in the reverse direction. That is, this is the normal condition. By the movement of other controlling devices the clutches are respectively made active in raising or lowering one or both ends of the upper roll. The loose parts of the clutches are integral with continuously running bevel gears driven in reverse directions by a bevel pinion on the motor shaft, which runs continuously in the same direction and need never be stopped or reversed in the ordinary operation of the rolls. The two levers controlling the clutches are connected together and operated by a single handle, so that the engaging of one means the disengaging of the other, while both are disengaged in a central position. This handle is placed near the motor and convenient to the position ordinarily occupied by the operator.

For the raising and lowering of the upper roll the handle near the center of Fig. 2 is manipulated and the movement is communicated to either or both ends of the roll by the two levers beneath and near the left hand ends of the rolls, as seen in Fig. 1. This part of the mechanism does not differ materially from that described in connection with the roll bender in the former issue and may be understood by a reference to that article.

The general description of the rolls may also be had from the previous article, but it may be interesting to repeat the main dimensions. The rolls are 12 ft. 4 in. between the housings; the top roll, which is the idler, weighs 3 tons and is 13 in. in diameter, while the two lower rolls are each 10 in. in diameter. The machine has a capacity for bending sheets 12 ft. wide and ⅝ in. thick, occupies a floor space of about 4 x 22 ft. and weighs approximately 30,000 lb.

The Osterlein clutch used on this machine is of the friction type, employing a band and drum. The clutch is engaged or disengaged by a longitudinal movement parallel to the shaft. This, as may be indistinctly discerned in Fig 2, causes the deflection of a rock shaft carrying a knuckle joint connecting the ends of the friction band. Turning the shaft in one direction draws the ends of the band together, so that they clamp the continuously revolving drum keyed to the adjacent large bevel gear. The clutch is then engaged and is held in locked position by the toggle action in the actuating member. The clutch is extremely simple, being controlled by one lever and adjusted by one screw. Its parts are few and its power great, making it one particularly suitable in a machine of the class described.

The Largest Atlantic Liners.

It was a noteworthy coincidence that brought on the same day, September 20, the launchings of the Mauretania, the largest mail steamer, and of the White Star liner Adriatic, the largest intermediate liner built in England. The former was floated from the yard of Swan, Hunter & Wigham Richardson, Ltd., Walls-end-on-Tyne and the latter from the yard of Harland & Wolff, Ltd., Belfast. London *Engineering* gives the following details:

The Adriatic represents one further step in the development of the immense intermediate ship, with which the Belfast firm has been closely identified for several years. It is difficult to fix definitely the beginning of this type, but, for purposes of comparison the Oceanic may be accepted, since she was the first notable vessel built for the Atlantic mail service in which the owners —the White Star Company in this instance—refused to emulate their competitors in respect to speed. The Oceanic was built six years subsequently to the Cunard liners Campania and Lucania, and almost contemporaneously with the first of the German-built high speed vessels—the Kaiser Wilhelm der Grosse; but the owners decided to limit her speed to 21 knots, as compared with the 22 knots of the Cunard liners and the 22½ knots of the German vessel. The later Atlantic ships of the White Star Company have even a less speed; but there has been a steady advance in the size and carrying capacity of the vessels. The Oceanic was followed by the Celtic, in 1901, the length being approximately the same, with greater beam and greater depth, so that the gross registered tonnage was increased to 20,880 tons. Then followed in 1903 the Cedric, with still greater beam in proportion to length, in 1904 the Baltic, and now the Adriatic, in which there has been a still further advance in tonnage, as is shown in the table appended. All the later ships are of 16-knot speed and the accommodation provided is for about 3000 passengers, of whom about 350 are of the first class and 250 of the second class. The total marks an increase of about 700, as compared with the Celtic and Cedric. The following table gives comparisons of the large intermediate liners:

Year.	Oceanic. 1899.	Celtic. 1901.	Cedric. 1903.	Baltic. 1904.	Adriatic. 1906.
	Ft.	Ft.	Ft. In.	Ft. In.	Ft. In.
Length	704	700	680 9	725 9	725 9
Beam	68	75	75 3	75 6	75 6
Depth	44	49	....	57 8	about 58 0
Gross registered tons	17,274	20,880	21,034	23,876	about 25,000

Two slightly larger ships even than the Adriatic have been built for the Hamburg-American Line—one, the Amerika, by Harland & Wolff, and the other, the larger, the Kaiserin Auguste Victoria, by the Vulcan Company of Stettin, which has constructed all the fast German liners. This latter ship is 699 ft. between perpendiculars, 77 ft. beam, with a registered tonnage of 25,500 tons. Her engines are of 17,500 hp., to give a sea speed of 17 knots. Accommodation is provided for a greater number of first and second class cabins. It is almost impossible to compare these intermediate ships with the Mauretania and Lusitania, the 25-knot Cunard liners, which excel all of the ships named in all dimensions, the length between perpendiculars being 61 ft. more and the beam 11 ft. greater than in the case of the German ship, which holds the record for size, so that the gross registered tonnage is 7700 tons greater. The speed is 25 knots instead of 17 knots. This addition of about 50 per cent. in speed has involved four times the engine power. We have thus, as between Britain and Germany, the following comparison between size and power, both in intermediate and in mail steamers:

	Mail steamers.		Intermediate liners.	
	Mauretania.	Kaiser Wilhelm II.	Adriatic.	Kaiserin Auguste Victoria.
	Ft.	Ft. In.	Ft. In.	Ft.
Length over all	785	706 6	725 9	....
Length between perpendiculars	760	...	...	699
Breadth	88	72	75 6	77
Depth	60 6	52 6	58 (ca.)	...
Gross tonnage	33,200	20,000	25,000 (ca.)	25,500
Approximate displacement (tons)	43,000	26,000	40.000	35,000
Indicated horsepower	68,000	38,000	14,000 (ca.)	17,500
Speed	25 knots	23½ knots	16 knots	17 knots

The Adriatic has accommodation for about 3000 passengers and a crew of 350 (including officers). She has extensive cargo carrying holds. This latter is one of the distinguishing features of the intermediate ship. As the speed is not so important there is a reduction in the area taken up by the propelling machinery; the lines, too, are fuller, increasing the width of the cargo holds forward and aft. In the Adriatic, for instance, there are seven cargo holds, and two of the 'tween deck holds are insulated, while two are fitted as deep tanks for the carrying of water ballast. The refrigerating chambers for the carriage of chilled meat are operated from machines on the CO_2 principle. In addition to the usual winches and derricks there will be electric gear for dealing with passengers' baggage and stores on the voyage. An electric passenger elevator is introduced in this, as in some of the preceding large vessels.

The scantlings of the vessel are very heavy; the general construction of the ship follows the lines adopted in the modern leviathan. The double bottom is 5 ft. 1 in. in depth, except in the machinery compartment, where it is 5 ft. 10 in. The cellular spaces between bottoms are arranged for carrying water ballast. The frames are of channel bars and the shell plates are in many cases over 30 ft. long and 5 ft. wide, weighing between 3 and 4 tons each. Hydraulic power has been used largely in connection with the riveting.

There are nine steel decks, three of these being above the shelter deck. On the upper promenade deck there will be situated a lounge, reading and writing room, and a smoke room for the first-class passengers, while on the next two decks are arranged the greater part of the staterooms. In this ship there will be a large number of single berth rooms. The first-class dining saloon is on the upper deck. The main dining saloon occupies the full width of the ship and has seating accommodation for about 370 passengers, the arrangement of small tables being more characteristic of the modern restaurant.

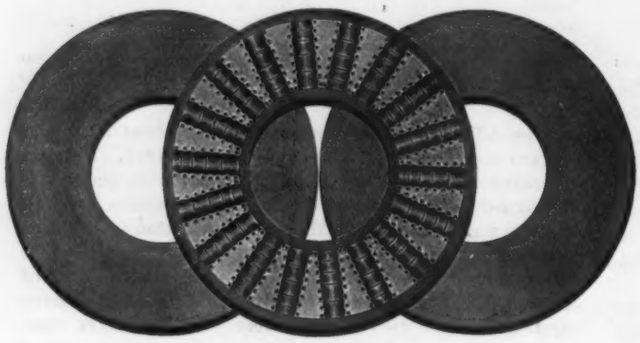
The second-class quarters are located abaft the first-class accommodation, and here the dining saloon has seating accommodation for 240 passengers and there is a smoke room and ladies' room. The third-class passengers occupy the extreme aft end of the ship, and, to a limited extent, the forward end. A notable feature is the introduction of two, three and four berth rooms, and there is, as in many of the recent large ships, a dining room, and also music and smoking saloons.

The machinery of the Adriatic is of the quadruple expansion type, and there is fitted not only a Marconi telegraph station on the upper promenade deck aft, but submarine signaling apparatus, so that the vessel in a fog may be able to receive signals from lighthouses.

The Bantam Roller Thrust Bearing.

A friction reducing thrust bearing is often needed on shafting, cranes, turntables, &c., where the space is too small to permit the use of a ball bearing. For such service the Bantam Anti-Friction Company, Bantam, Conn., furnishes the thrust roller bearing shown in the illustration. It consists of cylindrical rollers, with their axes radiating from the shaft center, held together in a bronze or steel cage and adapted to run between two hardened and ground steel collars. The length of each roller is about one-half its diameter, which has been found sufficient to reduce to an insignificant amount the slip of the rollers caused by the variable speed at different distances from the center of the shaft.

For slow speeds these bearings give excellent satisfaction. It is plain, since the tendency of these rollers is to travel always at a tangent to the motion of the retaining case, that at high speed their action would be that of a milling cutter cutting endwise, and that they would also slip and slide instead of rolling, to a considerable extent, but for slow speed they give excellent results and will carry enormous loads as compared with ball bearings.



The Parts of the Roller Thrust Bearing Made by the Bantam Anti-Friction Company, Bantam, Conn.

It is claimed that roller bearings will eliminate about half of the friction found in ordinary rubbing contact thrust bearings.

The Influence of Nitrogen on Iron and Steel.

The *Revue de Metallurgie* gives the data collected by Hjalmar Braune, who has been working for six years on the problem of explaining the abnormal brittleness of certain samples of iron and steel, such brittleness not being due to the presence of phosphorus, sulphur or other elements whose influence on the metal is well known. Mr. Braune asserts that this accidental brittleness is caused by nitrogen which has entered into combination with the iron during certain stages of its manufacture. Nitrogen is found to be combined exclusively with the pure iron, the ferrite, and forms with it a nitrous compound from which the carbides, such as cementite, are absolutely free. The nitride of iron exists in the ferrite in the state of solid solution and lowers its melting-point; at the same time it reduces its power of dissolving carbide of iron. Nitrogen on this account exerts a powerful influence on the quality of the metal, not only on soft iron but also on hard steels and cast iron. Experiments tending to prove this fact are given, in the course of which samples of iron or steel of good quality were heated for various lengths of time to a temperature of 800° C. in ammonia, so as to cause the iron to combine with more or less nitrogen. The test pieces were subsequently reheated in sand to enable the nitrogen to become homogeneously distributed throughout the metal. The mechanical tests indicate the great loss of tensile strength due to this treatment, and micrographic diagrams show the alteration of the minute structure of the metal. As the proportion of nitrogen rises the cellular structure disappears and is replaced by one composed of small dark rods or striæ. It is rare to find as much as 0.07 per cent. of nitrogen in iron, but in very soft samples, especially of Lancashire iron, a smaller percentage than this tends to make the metal harder and more brittle. Graphic diagrams are given to indicate the effect of nitrogen on the mechanical quality of iron and steel. In the case of the latter, with 0.5 per cent. of carbon, the critical point, corresponding with the disappearance of malleability, is reached when the nitrogen amounts to 0.040 or 0.045 per cent. Steels with 0.2 per cent. of carbon become brittle when nitrogen is present to the extent of 0.05 to 0.06 per cent.

H. Le Chatelier, in commenting on Braune's discovery, states that its importance will be patent to all metallurgists. Acid and basic steels of similar composition which have undergone the same treatment have not always been found to possess the same mechanical properties, and these facts appear to contradict certain known laws, and have led to the suspicion that steel is an exception to the ordinary rule which governs the mutual interdependence of certain ascertained phenomena. Reference is made to the investigations of previous writers who have called attention to wide differences in steel from the same works, and made in a precisely similar way. Steel submitted to the cementation process generally becomes extremely brittle if it is not subjected to an appropriate after-treatment, and it was held that the requisite prolonged heating was the sole cause of the alteration of the central portions of the mass of soft metal, which can apparently undergo no change. Ordinary systems of chemical analysis, which are necessarily incomplete, leave room for the nondetection of certain constituents in the metal which are difficult to estimate, as, for instance, hydrogen and oxygen, of which the injurious action has been otherwise demonstrated by indirect means. It has been customary to vaguely refer to the presence of these elements, owing to the impossibility of practically arriving at the amount of the inculpated impurities in industrial laboratories. The investigations of Mr. Braune give an unforeseen prominence to this industrial problem of paramount importance, and point to the nitrogen as the agent, which no one has hitherto suspected. This new enemy of metals, which is indicated as the cause of the anomalies to which reference has been made, can readily be estimated by analysis, and it will thus shortly be possible to define very precisely the sphere of its action and probably to overcome it without any great difficulty. These researches have the advantage of co-ordinating a whole series of scattered facts for which no explanation has hitherto been found. Mr. Braune has, moreover, shown that the nitrogen of the atmosphere cannot act directly on the iron, but that the intervention of basic slags is needful in a reducing medium; the fixation thereof is in direct relation to the formation of cyanides, and as it was already well known that blast furnaces producing cyanide of potassium yield a bad quality of iron Mr. Braune was led by this fact to inquire into the action of the nitrogen.

Accompanying the use of larger charges of powder there has been introduced a new element, erosion of the bore, limiting the life of guns. This is very great, indeed, in the neighborhood of the seat of the projectile, and very decided in its action, scoring and guttering the surface in a manner requiring its renewal after a certain number of rounds. The life fixed by this process was not unreasonably short until the use of smokeless powder, when the great increase in the velocity imparted to the projectile became general. This wear is of a different kind from that previously experienced, being, instead of a deep guttering, a smooth and even wearing away of the surface, which proceeds with such rapidity that the previous life of 300 rounds before relining has been reduced to 50 or 60, beyond which, in large guns, the rifling is so far obliterated that the projectiles are no longer given the motion of rotation necessary to steadiness of flight, and inadmissable loss of accuracy results.

Tin Mining in the Malay States.*

Tin mining in the Federated Malay States is receiving more attention than those at home generally suppose. There is little doubt that the surface has really only been scratched, as it were. Up to a very few years ago the industry was in the hands of small men, mostly Chinese. Before touching upon the actual tin ore getting, a few notes relating to the country itself may not be out of place. The figures below are taken from the "Official Manual of Statistics," published by the Government. The states which comprise the federation are:

	Square miles.	Inhabitants.
Perak	6,581	400,000
Selangor	3,200	234,404
Negri Sembilan	2,600	118,747
Penang	14,000	85,000
Totals	26,380	838,151

Each of these states has a British resident, who, with his secretary, is supplemented by other diplomatic and departmental chiefs, who preside over the courts, public works, police, railroads, post, telegraphs, &c.; and they, with the Sultan of each state and his council, provide for the welfare of the individual countries. Approximately the length, taken from the frontier of the Jehore territory on the south to that of Kedah on the north, is 250 miles, with an average breadth of over 100 miles, and a very large proportion of this is still virgin jungle, which is capable of development at any moment.

The western side of the peninsula, comprising the states of Perak, Selangor and Negri Sembilan, has so far shown itself the most remunerative. The railroad lines, now under one administration, and called the Federated Malay States Railways, have a total length of over 400 miles, and run from the northern terminus of Penang on the north to close upon the Jehore frontier on the south. The general manager is now pushing the construction of the line to Jehore, and hopes before long to connect Penang with Singapore and so run the mails, without change of carriage, a total distance of about 370 miles, into that city which is appropriately named the "Gate of the East." By this means nearly a week will be saved in the time it takes to get an answer in London from Singapore.

To return to the tin mining industry. In England we mostly give our attention to those mines which are publicly known on account of their being registered companies. In addition to these—viz., the Gopeng, New Gopeng, Kinta, Tronoh, Pusing, Redhills and Rambutan mines—there are others which yield very large quantities of ore, and are the property of private owners. The very large mine belonging to Mr. Boobie, near Taiping, is an instance of this, as well as the mine at Tambun, near Ipoh. This latter is also owned by a Chinaman—Long Fee. A few particulars of this mine are as follows:

A Chinese Mine.

It is situated about 10 miles from Ipoh, in the state of Perak; the manager is Mr. Nutter, who within the last three years has fitted it up with the latest English machinery, which has already paid for itself over and over again. The puddles and sheds generally are situated in a valley, so that the ore descends by gravitation from the mine proper; it is quarried by Chinese labor and paid for per cubic yard delivered to the works, all trucks and material being supplied by the mine owner.

The mine was only started some four years ago, the owner having acquired the land from a coffee planter. The output of washed tin ore is enormous and the profits proportionately great. Long Fee is a millionaire and is very liberal with his money; he recently gave a very large sum to be used for scientific research in connection with the School of Tropical Medicine at Kwala Lumpur.

It is here that the so-called Chinese mining is carried on, and is briefly explained as follows: Shafts are sunk at 40-ft. centers apart to a depth of, say, 50 to 100 ft., according to the quality of the earth met with; then from each shaft the Chinese coolies work, or drive horizontally, going on until they meet the men from the adjacent shafts. In this way a layer of earth is removed, say, 4 ft. thick, and sent up the shaft in baskets, which are hoisted by means of a wooden windlass. As this layer of earth is removed wooden props are inserted, which support stout boards at the top; these keep the roof from falling in. The feet of the props rest only on the floor, and as this is being continuously dug out, the props gradually sink by the pressure of the superincumbent weight of the roof and earth above. The stout boards prevent the roof falling in, but as the ground is dug out they, with their supports, always keep the 4 ft. clear space which enables the men to work. The method is certainly dangerous, but effective. The surface above gradually sinks as the earth is removed from below.

The Tronoh Mine.

The Tronoh mine is one well worth visiting; it belongs to the Tronoh Mines, Limited, and is situated about 20 miles south of Ipoh. The clay and sand are quarried partly in the open, in a similar manner to an ordinary brick field, and partly got by driving "slants" into the hill. The management is exceedingly energetic; and by putting down new steam plant and a large Cornish pumping engine it is now able to overcome the rushes of water which recently gave a good deal of trouble. The output of ore is steadily increasing.

The machinery for washing and crushing is extensive, and of the latest type. The earth is tipped into puddlers and concentrators, after which it is washed by hand. The larger lumps are all crushed and put back into the concentrators. The ore is also passed through trommels two and three high and the finest grade is extracted.

In addition to the mines mentioned before, some are now worked by "hydraulicking," using high pressure water, after the California fashion; the low pressure system is also used. In the latter case the water is pumped up, and allowed to run down over the strata, bringing the sand and ore with it as it runs down into the valleys; this is again concentrated and washed for the finer grades. The Gopeng and New Gopeng companies have adopted the hydraulic means of getting ore.

Chinese Thoroughness.

It is interesting to note how carefully the Chinese coolie washes right down to the finest grade; he seems to have a special aptitude for this. Even when the large mines have extracted what seems to be all the ore the Chinaman takes the tailings from the mine on royalty and makes a living out of these. It is no uncommon thing to see two Chinamen tramping into the town with a bag of ore on their shoulders, slung between them on a stick. This has been won off what a European would starve upon.

Not only do they take the tailings, but they will rent a small piece of ground, and with their primitive shovels, baskets, sieves, rakes, &c., will do quite an extensive business. Hundreds of these little men work in this way and each man's gettings go to swell the output of the Malay States. Such miners choose a pitch where the top or overburden is only, say, 5 to 20 ft. deep. They remove this and then get the ore bearing stratum and wash it, in order to concentrate it fit for the smelter.

The ore from the mines, when it has been fully concentrated, contains from 70 to 75 per cent. of metallic tin; it is thoroughly dried on stoves and packed in bags of about 66 lb. (one-half pikul) weight. These are then conveyed by bullock carts to the railway station or to the seaport, and sent to the smelters. The two largest smelting plants on the coast are one on the Island of Paulo Brani, near to Singapore, and the other at Butterworth, near Penang, about 400 miles northwest of Singapore.

Companies who own the smelting works buy the ore on assay; but as a good deal of misunderstanding arises at times, especially with the Chinese, some miners are seriously thinking of smelting at the mine. No doubt, when the railroad is further developed coal will be available up country on account of the easy transport from the seacoast, so this will enable the owners to send down metallic tin instead of ore, as they do at present.

As far as can be now seen, there is no reason whatever to prevent further great strides being made in the tin mining industry of the Malay states and a substantial increase in the output of the metal being brought about in the near future.

* Abstract of an article in London *Engineering* of August 31 by John Place.

The Simplon Tunnel Power Equipment.

BY FRANK C. PERKINS.

Since the completion of the Simplon Tunnel, the longest in the world, the next matter of interest has been the electrical equipment for hauling the heavy trains through it. The tunnel passes through the Alps, one entrance being at Iselle in Italy and the other at Brigue in Switzerland, and near each entrance is located a power house. The two power houses supplied power for the tunnel during the course of its construction and will hereafter furnish the power for operating trains through the tunnel and for ventilating it. The hydraulic arrangements have not been changed materially, but the machinery and equipment have been remodeled to some extent.

This tunnel connects the railway system of western Switzerland with that of north Italy and is 12.3 miles long. The northern entrance of the tunnel in the Rhone Valley at Brigue lies 2250 ft. above the level of the sea, while the southern entrance in the Valley of the Diveria, beyond the Italian border, is 2080 ft. above sea level.

During construction the power plant and machinery outside of the tunnel was, with the exception of a few details, practically the same on both sides. On the north side the water for the turbines was taken from the Rhone, while the Diveria supplied the water power on the south side, the water being taken at a point 2½ miles above Iselle. On the north side the plant consisted of four Pelton water wheels, with horizontal shafts, producing a total of 1500 hp. for driving the high pressure pumps and the air compressors for the air locomotives; two 200-hp. turbines for driving the large fans, two 300-hp. turbines coupled direct to Sulzer high lift centrifugal pumps, shown in Fig. 1, for supplying the cooling water to the tunnel; one 110-hp. turbine and two smaller ones for driving dynamos and the machine tools. As reserve three semiportable engines of 60 to 80 hp. were provided.

The pumping station at Brigue supplied the hydraulic pressure for driving the drills, tunnel fans and spraying apparatus, and consisted of six twin high pressure pumps, which together gave an output of about 12 gal. per second at a maximum of 1600 lb. This pressure was fed to a common collecting pipe of 6 in. in diameter, from which two separate mains of 4 and 4¾ in. in diameter led to the tunnels. For regulating the pressure two-weight accumulators were provided.

At the Brigue power house the hydraulic turbines were installed by Escher, Wyss & Co., Zurich, Switzerland, and operate under a head of from 148 to 180 ft., developing 600 hp. each at a speed of 160 to 170 rev. per min. The water is received through a pipe line about 63 in. in diameter from the River Rhone. The two turbines are directly coupled to a 12-pole revolving field three-phase alternator, constructed by Brown, Boveri & Cie., supplying current at 16 cycles and 3000 volts. The turbines are not provided with governors for variable loads, but run at constant speed, and any surplus current is wasted through water resistance.

The exciter dynamos at the Brigue power house are of the Oerlikon type and were used for lighting the tunnel during the construction period. These direct-current dynamos run at 500 rev. per min. and deliver a current of 520 amperes at 125 volts. The main current supply, furnished by the alternators, is conducted from the Brigue power house to the conductors in the tunnel at a pressure of 3000 volts and is utilized by the electric locomotives directly at this pressure, all of the necessary transforming apparatus and controlling devices being mounted on the locomotives themselves.

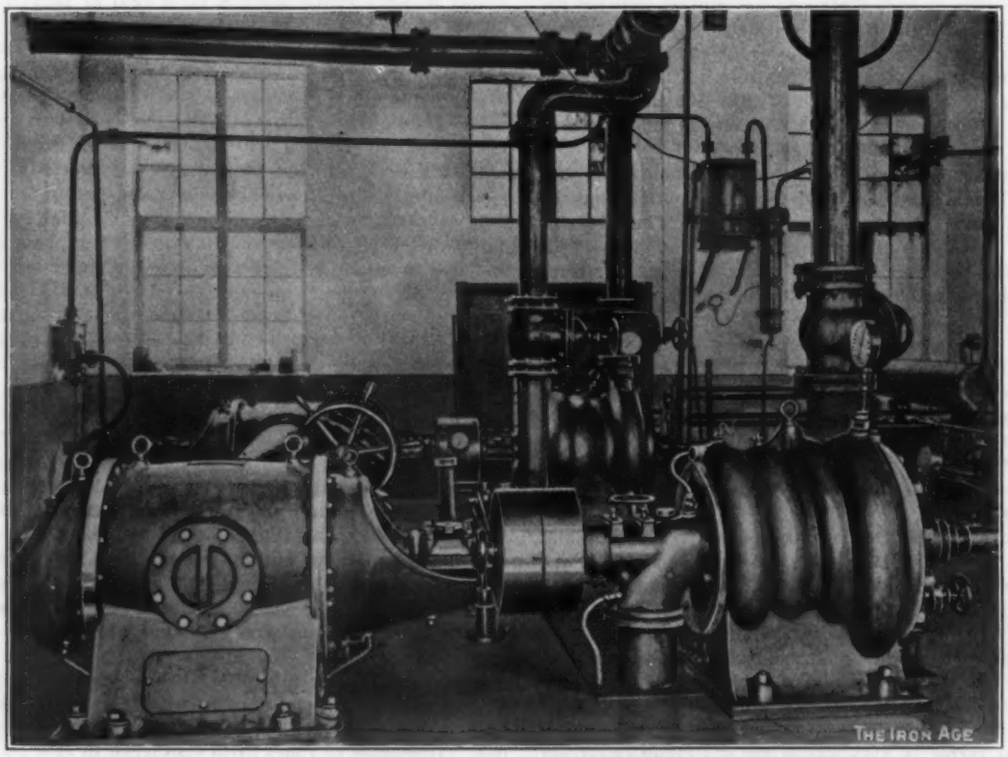


Fig. 1.—Hydraulic Turbines Driving Sulzer Centrifugal Pumps in the Brigue Power House.

The Iselle power house, located at the Italian entrance to the tunnel, is supplied with water from the Diveria through a system of pipes 35½ in. in diameter. Its equipment is new and includes two turbines constructed at Geneva, Switzerland, by Piccard, Pictet & Cie., which operate at a speed of 960 rev. per min., working under a head of 460 ft., and develop together 1500 hp. These turbines are also direct connected to an alternator supplying three-phase 16-cycle current at 3300 volts. A section through one of these turbines is shown in Fig. 2, and Fig. 3 is a view of one end. The current is transmitted from this station to the tunnel feeders and passes to the locomotives from the two overhead trolley lines in the tunnel and the track, which forms the third conductor.

The turbines are of centrifugal reaction type, with speed regulation by control of the openings in the wheels. The governor is mounted on an extension of the founda-

tion near the generator, and controls both turbines simultaneously. The time required to open and close the turbine wheel orifices is relatively small. These orifices remain open when the turbines are running at a high rate of speed. When the turbines are running with light load, if the orifices be suddenly opened the two turbines will give their full power in a moment. A feeble movement of the governor is enough to affect the openings in the wheels, so that the sensitiveness of speed regulation is very great. It is so arranged that one turbine may be put out of service without stopping the other, that is, either may be run independently in case of necessity. In most of the other particulars the equipment at Iselle is about the same as that at Brique.

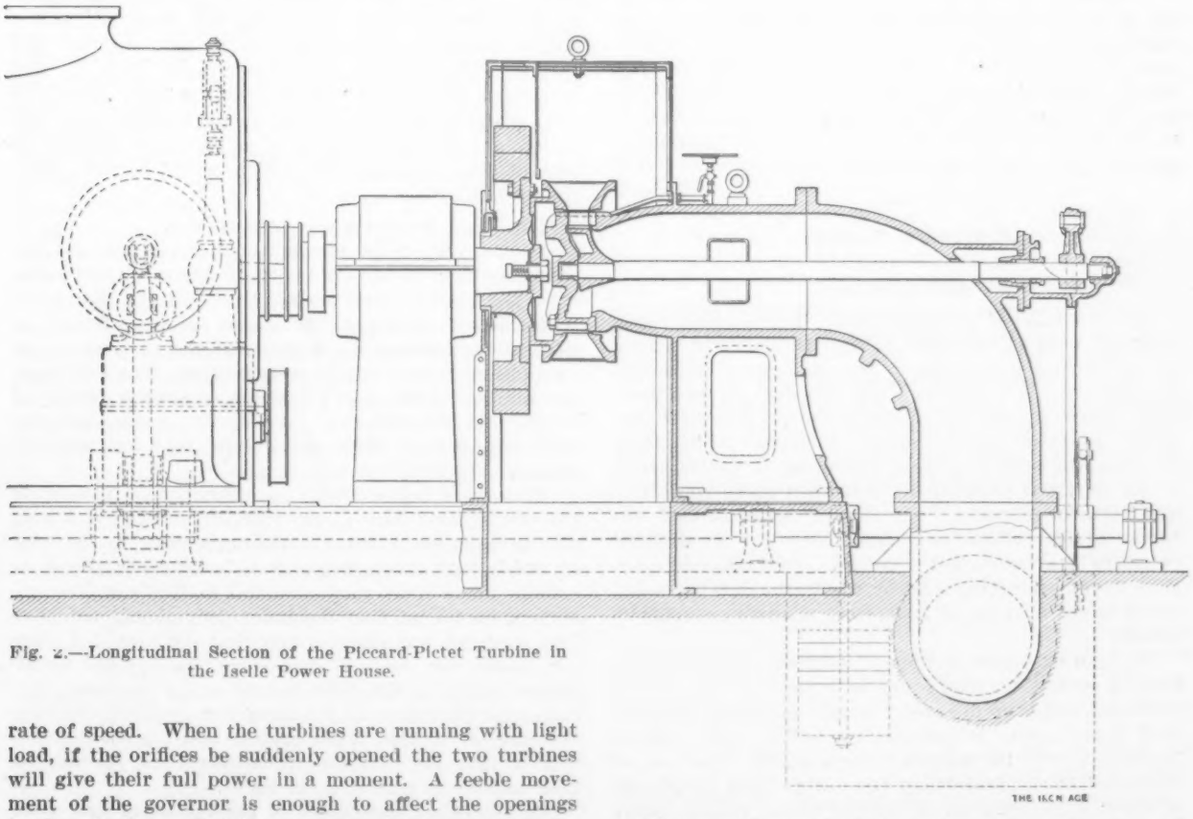


Fig. 2.—Longitudinal Section of the Piccard-Pictet Turbine in the Iselle Power House.

The electric locomotives now in operation were constructed by Brown, Boveri & Cie, Basle, Switzerland, jointly with the Schweizerischen Lokomotivefabrik, Winterthur, Switzerland, as well as by Ganz & Co., Budapest, Hungary, builders of the electric locomotives that were used extensively on the Valtilina Railway in northern Italy.

The normal speeds of the trains will be 22 miles per hour for heavy trains and 43½ miles for light trains. Each locomotive has two motors and three pairs of driving axles. The motors are connected to two of these axles, and the third is positively driven from the live axles by connecting rods on the wheels. The driving wheels are about 5½ ft. in diameter. The trailer wheels, one pair at each end, are about 2½ ft. in diameter. The two normal speeds of the locomotive are obtained by

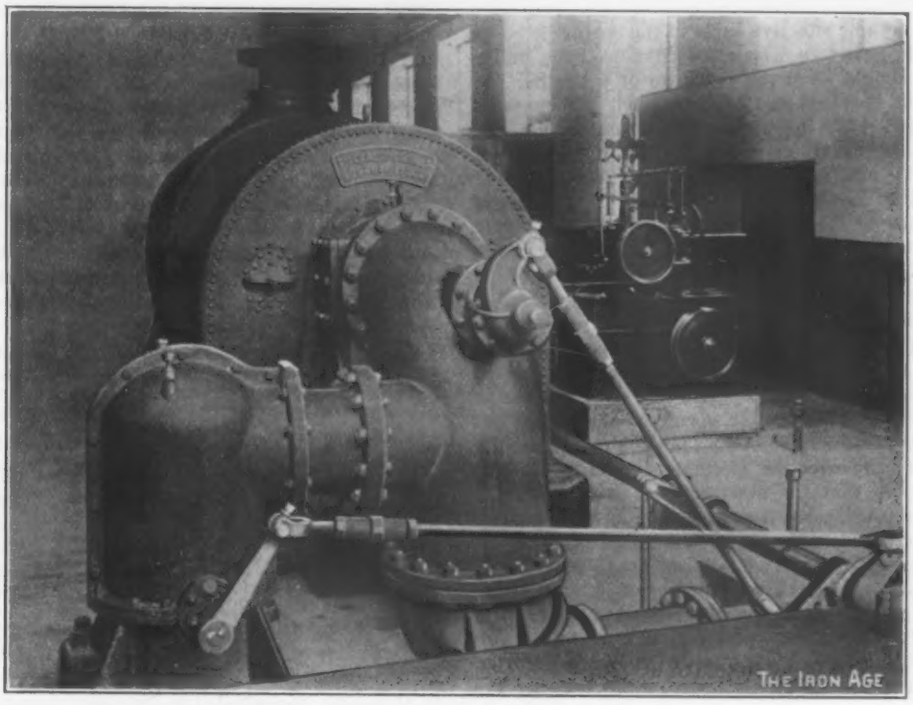


Fig. 3.—End View of the Turbine Shown in Section in Fig. 2.

changing the number of poles on the stator. This number is 16 or 8, as the case may be. The normal power of each motor is 450 hp., and the weight nearly 11 tons. The locomotive entire weighs 62 tons.

The main ventilating plant on either side of the tunnel is provided with two centrifugal fans 148 in. in diameter, the diameter of the intakes being 49 in. This arrangement allows of various combinations for working. When coupled for quantity the two fans can supply to or draw from the tunnel 1750 to 2100 cu. ft. of air per second. In the completed tunnel one set of fans will blow air in and the other withdraw air from the tunnel.

Customs Matters.

Open Hearings.

After a trial of several months the so-called "open hearing" plan of procedure before the Board of United States General Appraisers in reappraisement cases does not appear to be a success. The adoption of open hearings before the Board of Appraisers took place last spring and was one of several concessions dealing with the American customs regulations asked for by Germany. In the past few years there have been many controversies between importers of German products and the United States customs authorities regarding the dutiable values to be attached to the entries. Such disputed questions have been adjudicated by the Board of Appraisers, which is the tribunal of last resort in cases referring to values.

German exporters and manufacturers have frequently suffered severe financial losses as a result of the board's decisions, which up to several months ago were made behind closed doors. It has been the belief of the German interests that if the alleged "star chamber" methods of the board in reappraisement cases were done away with a fairer administration of justice would result. After Baron Speck Von Sternburg, the German Ambassador, had discussed the matter with the President and the Secretaries of State and of the Treasury, an order was issued directing the board to hold open hearings whenever in its judgment the public interests would not be jeopardized.

The order became effective early in the spring, it being provided that importers whose merchandise was under investigation should have the privilege of attending the reappraisement hearings and examine such witnesses as the Government might have called in to assist in determining the proper foreign market value on which ad valorem goods are assessed for duty. After several months' trial it has developed that very few requests have been made to the board for "open hearings," while in those instances where the concession was operative importers called as witnesses refused to attend and be subjected to examinations likely to divulge trade secrets.

Administrative officers of the customs express much surprise that importers of German merchandise have made so few requests for the application of a concession so persistently sought. The opinion is fairly general in American customs circles that open hearings have not been a success in directions other than the one of apathy on the part of importers of German merchandise. The officials complain that the unwillingness of importers to have their identity known to the merchant whose goods are before the board is the chief drawback to open hearings. Further than this, it is alleged by those familiar with the situation that even when open hearings are granted it is usually necessary to receive additional testimony regarding values secretly. The claim is also made that open hearings consume an undue amount of time. Considerable speculation exists as to whether the Government will make other concessions to Germany in view of the reception accorded the open hearing plan by handlers of German goods.

Duty on Steel Cylinders.

The Board of United States General Appraisers on October 3 handed down a decision sustaining the contention of Thomas Prosser & Son that steel cylinders 24 in. in length are entitled to entry at the rate of 35 per cent. under the tariff provision for "steel tubes finished, not specially provided for." The appraising officer reported to the board that the cylinders were evidently parts of machines and that on that account he had returned the merchandise at 45 per cent. as a manufacture of metal. In sustaining the claim of the importer General Appraiser Fischer remarks that the fact that the cylinders may be parts of machines in no way bars them from classification under the lower duty. He adds that the cylinders are perfectly straight from end to end, and the board knows of no authority, either lexicographical or commercial, which would exclude them from classification as tubes.

Duty on Wire Rat Traps.

Another step in the protracted litigation over the customs classification of wire rat traps was taken last week, when the United States Circuit Court for the District of Massachusetts affirmed the action of the Board of General Appraisers in approving the imposition of an additional duty on the merchandise. The rat traps, the subject of the court's decision, are made chiefly of coated wire, smaller than No. 16 wire gauge, but provided with a small sheet metal plate and a lead counterweight.

They were held dutiable as prescribed by paragraph 137 of the tariff law at the rate of 2 cents per pound, plus 2 cents per pound, the rate applicable to the wire of which they are made, plus 1.25 cents per pound as articles made from wire. Burdett & Williams, the importers, contended that the latter duty should not have been assessed and alternatively that the rate of 2 cents per pound for coating should not have been levied. Judge Lowell, in his decision written for the court, discusses the provisions of the tariff law applicable to merchandise of the kind under protest and reaches the conclusion that the customs authorities were justified in their manner of assessing the duties.

In overruling the claims of the importers the court says: "While the language of the act is not quite clear, yet upon the whole Congress apparently intended to impose an additional duty for coating wire with metal, and this additional duty is due whether the wire is imported as wire or has been manufactured into some other article."

Duty on Parts of Plows.

The Board of United States General Appraisers rendered a decision September 29 to the effect that parts of plows cannot be deemed plows under the terms of the tariff law. The case came before the customs tribunal in the form of a protest filed by Lilienthal & Co., Los Angeles, Cal. The customs authorities assessed duty on the merchandise as manufactures of metal not specially provided for with duty at the rate of 45 per cent. It was maintained by the importing firm that the articles should be granted a 20 per cent. duty as plows. In his decision written for the board General Appraiser Fischer says in part:

> Even if the description quoted from the importers' papers is correct the claim is untenable for the reason that, while paragraph 460 provides for certain specified agricultural implements, it contains no provision for parts of such implements, which must consequently be relegated to the general provisions for articles of metal contained in paragraph 193.

The board lays down the rule that where a tariff paragraph provides for an article by its specific name but not for "parts thereof" it is not applicable to importations of such parts. The protest is accordingly overruled and the collector's assessment affirmed.

By the addition of unground Portland cement clinker to a mixture of vegetable wax and caustic lime, all being ground together, a waterproof cement has been invented in Germany, for which the inventor claims that the application of a ½-in. coating to a brick wall will render the wall absolutely watertight. The formula is given as follows: To each 200 lb. of cement clinker are added a mixture of ¾ lb. of japan vegetable or berry wax and 1 oz. of caustic lime which has been dissolved in 14 pints of boiling water. These ingredients are thoroughly mixed and when cooled are dried and ground very fine with the cement clinker.

Metal Cross Ties.*

BY H. T. PORTER, PITTSBURGH.

In the fall of 1900 there was furnished to the Bessemer & Lake Erie Railroad about 1100 steel ties. These were the Carnegie M-14 trough section. During November and December about 750 intermediate ties were placed south of Osgood in a piece of 100-lb. rail track where the alignment was a compound curve of 6° 30′ reducing to 3° 30′, followed by a 9-degree reverse curve. During the following March and April after the slotted angle bars were received, the joint ties were put in. The track was then ballasted in the usual manner with furnace slag. About one-half of these had an angle riveted on the under side at the center of tie, and the balance had an angle riveted on the under side just outside of each rail. The object of the angles was to hold the track in line. They caused some inconvenience in the final lining of the track after it was surfaced. At the time the ties were put in all trains ran over this track, but after May 1, 1902, southbound ore trains and a portion of northbound freights were handled over a new line running to the east, but the rest of the trains continued the use of this track. Trains were operated over the 9-degree curve about four years without resurfacing. On account of the soft roadbed portions of the compound curve did not run so long. These ties are still in and are giving good service, but are not as satisfactory as those used since.

In September, 1904, there were received about 1200 Carnegie I-beam steel ties. In November and December, 1904, and January, 1905, 1000 of these were put in the track about 2 miles north of Euclid station, where the track was laid with 100-lb. rails on white oak ties about six years old and ballasted with 6 or 8 in. of slag. The ties were put in by the regular section gang and without any special provision for placing track in better condition than it was before. Additional ballast was not furnished, and as the space occupied by the steel ties was so much smaller than that occupied by the wooden ties there was not sufficient ballast to half fill the track. Between November, 1904, and June, 1905, the road at this point was single track and carried the entire tonnage of the Bessemer & Lake Erie Railroad. On this section southbound trains are assisted by pushers, and during a portion of the time pushers with 180,000 lb. on the drivers were used. After June, 1905, southbound traffic has been handled over these ties. The supervisor reports that after the steel ties were put in on this curve he had much less trouble in keeping the track in line than he did before, notwithstanding it was hardly half filled with ballast. Considering that from November to June the pushers were backing up around this curve that this track held its line is very significant, the cause for which I have attempted to explain later.

Since then we have received 105,000 of these ties, about 70,000 of which have been placed in the track, to give them a thorough test under conditions existing on the Bessemer & Lake Erie Railroad.

Severity of the Service.

Substantially all the freight of this road is handled on that part of the line between Conneaut Harbor and North Bessemer, which is 146 miles in length. The freight tonnage is about 10,000,000 net tons per annum, with an average haul of about 120 miles; the line crosses eight water sheds, and as southbound 30-ft. grades and over are operated with pushers, it has seven pusher districts, covering about 33 per cent. of the road. The curves generally are from 3 to 4 degrees, though there are a number running from 6 to 8 degrees. On the north 15 miles of this line engines with 225,000 lb. on the drivers and south of this engines with 160,000 and 180,000 lb. on the drivers are used in handling freight trains. As about 8,000,000 tons of freight is ore and coal, loaded so that the gross weight of carload runs from 136,000 to 144,000 lb. per car, producing a load of 34,000 to 36,000 lb. on the axle, and as 60 per cent. of this line is still single track, you will note that the service is very severe.

This year we have made two changes in line, one ½ mile long, and the other 3½ miles long. In this work and on all second-track work we use steel ties. On a portion of this work the track was laid with steel ties across a creek bottom and blocked up, and afterward raised to grade by running on it filling in 80,000 to 100,000-lb. capacity cars, loaded to their full capacity, which were then unloaded and used in raising the track. We are using these ties in new work under all conditions where wooden ties have been used, and find that, taking everything into consideration, it can be done with the same facility and convenience as with wooden ties. In maintenance work either steel or wooden ties, which ever happens to be on hand, are distributed. Steel ties are used in renewing, whether there be one, two or more ties in a place to be renewed—that is, they are used in the main tracks under all conditions where wooden ties have been used.

Superiority in Connections.

The joints or connections are the feature in which steel cars and bridges to the greatest degree excel wooden ones, and in an all metal track construction you can obtain a superior connection between rail and tie. In an all metal track you obtain not only the instantaneous resistance of both rails and adjoining ties to lateral blows or forces, but you have the friction between rail and tie made by the fastening in the joints in advance of and following those on which the load directly rests.

This rigidity in the track structure itself, independently of the ballast, accounts for the track on the 4-degree curve, where steel ties were laid in the fall of 1904, remaining in line without being filled and provided with a shoulder of ballast.

We have observed where steel ties are used that we obtain less wear and a more uniform wear of rails. This is accounted for by the better fastening, securing a better connection between rail and tie, preventing the rail from rolling and producing a lateral rigidity in the track structure independent of the ballast.

The life of wood white oak ties under heavy traffic ranges from four years on sharp curves to eight or ten years on tangents. There is a wide difference in the durability of timber, even when it is the same kind taken from the same pack of woods. It is beyond the ability of inspector or trackman to select ties that will give the same duration of service. The tie begins to deteriorate from the time it is put in place, the rate of deterioration increasing until it becomes necessary to remove the tie. There is no track work that compensates fully for this deterioration, so you cannot maintain a condition equal to an all new tie track.

The steel tie maintains its section and the bed under the tie does not have to be disturbed on account of tie becoming soft, nor on account of the effective thickness of the tie becoming less, due to rail or tie plate bedding into the tie. The steel tie up to failure retains the same dimensions and efficiency, reducing the work required for surfacing and lining, and it is possible throughout the life of the tie to maintain track of the same excellence as with all new ties. Up to the present time we have only had one broken rail on steel ties and the report attributes this break to a flaw in the rail.

The Life of Steel Ties.

We have not used steel ties long enough to determine their life under our conditions, but an examination of a broken tie after six years' service does not indicate that rusting under ordinary conditions should cause any anxiety.

Not having begun the use of automatic signals, I have not made any test of insulation, but am advised that effective insulation can be made without impairing the connection between rail and tie.

Steel ties have been furnished to the supervisors and section foremen, and they have been asked to freely criticise them. Whereas they do not claim that steel ties perfectly meet all conditions, they want steel ties whenever they can be furnished.

We have stretches of track laid with all steel ties

* Abstract of paper read before the Railway Club of Pittsburgh, September 28. Mr. Porter is chief engineer of the Bessemer & Lake Erie Railroad, owned by the United States Steel Corporation and operated by the Carnegie Steel Company.

up to 4.4 miles in length, and find that after the track is filled with ballast there is a very appreciable reduction of noise in general and at the joints below what can be obtained with wooden tie track.

Take any period of five years and the Interstate reports show that tie renewals are from two to two and a half times the cost of the renewal of rails. On the assumption that the steel tie can be produced at the same price per pound as the steel rail and that the life of the steel tie will be one and one-half times that of the steel rail, the cost of tie renewal would be about equal to that of rail renewal. Experience in Europe and observation from our own experience here indicate that a longer life will be obtained. The possible reduction of cost of tie renewals to the same cost as rail renewals shows the great economy obtainable from the use of steel ties. A portion of this reduction is due to being able to sell the old tie for scrap for 40 to 50 per cent. of its original cost.

I have attempted here to make a fair and simple statement of our experience, and will conclude with saying that we expect to continue the use of steel ties in maintenance and in new construction work on a still larger scale.

The Lake Superior Corporation.

The report of the Lake Superior Corporation, which owns the stocks of several companies centering around Sault Ste. Marie, for the year ended June 30 last, shows that the surplus over charges increased $522,078 over the previous year, while the total income was nearly doubled. The income account compares as follows:

	1906.	1905.	Increase.
Interest on securities of subsidiary companies	$1,102,044	$543,455	$558,589
Miscellaneous net income	36,700	42,084	*5,384
Total income	$1,138,744	$585,539	$553,205
Interest paid on first mortgage bonds	452,200	452,175	25
Interest accrued first mortgage bonds	37,683	.....	37,683
Balance	$648,861	$133,364	$515,497
General expenses, taxes, &c.	91,981	98,562	*6,581
Surplus	$556,880	$34,802	$522,078

* Decrease.

The general balance sheet as of June 30 compares thus:

Assets.

	1906.	1905.
Investments, loans and securities of subsidiary companies	$51,184,072	$51,201,928
Cash	55,261	76,095
Collateral securities	125,001	150,000
Treasury bonds	956,879	956,879
Furniture and fixtures	476	354
Due from subsidiary companies (advances)	2,064,279	1,531,543
Accounts receivable	9,293	.....
Totals	$54,395,262	$53,916,799

Liabilities.

Capital stock	$40,000,000	$40,000,000
Bonds	13,000,000	13,000,000
Bills payable	688,235	800,000
Canadian Improvement Company	.....	4,677
Coupons unpaid	73,873	25,900
Due subsidiary companies	7,288	29,400
Suspense account	34,183	22,020
Profit and loss (surplus)	591,682	34,802
Totals	$54,395,262	$53,916,799

President Charles D. Warren's report is in part as follows:

During the year the important plants of the operating companies have been actively employed, and in this direction the expectations of your directors have been realized. It is hoped that the current year will see other of the plants in operation and that the results to the corporation will be more profitable.

Blast Furnaces and Steel Rail Plant.—This, the principal industry, demands the largest share of attention and absorbs in its operation the greater proportion of the financial resources, while its further needs are inadequately met. It is most gratifying that this branch of the work shows great development and improvement. The estimated production of 150,000 tons of steel rails for the year has been exceeded by about 10,000 tons. The record output of steel rails for a day—1,004 tons—and 17,873 tons during August, 1906, shows the possibility of the plant and proves the advisability of further capital expenditure on the steel works. Your directors would like to provide at the earliest possible date for another blast furnace having a daily output of at least 400 tons. This would nearly double the present production of pig iron, and thereby furnish material adequate for the most advantageous operation of the rail mill. The present blast furnaces operated during the past year have made 130,902 tons of pig iron, which is considered a very satisfactory showing.

Open Hearth Furnaces.—The construction of two 30-ton open hearth furnaces has been authorized and their completion is expected early in December, 1906. This extension will make way for the profitable use of a large amount of scrap which has accumulated, and furnish additional material needed in the operation of the rail mill. This new open hearth plant has been planned with a view to extension.

Helen Ore Mine.—Less ore has been taken out of this mine than during the preceding year. Several causes have combined to produce this result, among which may be named some labor troubles and a fire which destroyed the hoisting apparatus and machine shop, all of which have since been replaced. The development work continues. Considerable bodies of pyrites have been found for which a ready market is available at profitable figures.

Michigan Power House.—Power has been furnished to the Carbide Company during the year. Unavoidable circumstances have delayed the construction of the works necessary to make the power house secure under the development of the maximum horsepower, to which reference was made in the previous report. Plans have been prepared and it is expected that the necessary work will be under way early next year.

The efficiency of the several plants has been well maintained by a liberal charge for repairs and general maintenance, while expenditures on betterments have resulted in more economic operations. For the two years ending June 30, 1906, $527,883.09 has been expended for betterments and extensions to property and plants.

On June 30, 1906, the total of the inventories of materials and supplies and outstanding accounts receivable held by the subsidiary companies amounted to $4,129,671.96.

The New England Foundrymen's Association.—This society has arranged an attractive list of meetings for the season. The November meeting will be held in New Haven, the programme to be announced later. Other arrangements follow: December 12, papers will be read by Thomas D. West, Sharpsville, Pa., on "Cause, Cost and Remedy for Carelessness," and Herbert E. Field, Pittsburgh, Pa., on "Foundry Education;" January 9, annual meeting; February 13, papers will be read by George Schumann, Reading Iron Company, Reading, Pa., on "Iron and Steel," and Arthur Simonson, Philadelphia, on "Molding Sands," illustrated; March 13, an address will be given by Prof. Edward F. Miller, Massachusetts Institute of Technology, Boston; April 10, a paper will be read by Edwin A. Moore, president of the American Coke & Gas Consumption Company, Camden, N. J., on "By-Product Coke;" May 8, a paper will be read by Roy U. Conger, New York, on "Scientific Salesmanship."

A patent has been granted to Frank G. Wright, Indiana Harbor, Ind., and assigned by him to the American Steel Foundries, on an apparatus for introducing powdered elements into fluid metal. It consists of piping in which is inclosed a blower tube connecting with a compressed air supply and the powdered material is projected through a nozzle into the stream of hot metal flowing from the ladle to the mold. A particular use of the apparatus is the introduction of manganese into steel for the purpose of hardening the casting.

Mexican Progress.

DURANGO, October 1, 1906.—Congress resumed its sessions on the evening of September 16. In his address to the Deputies, reviewing the country's industrial progress, President Diaz took occasion to refer briefly but significantly to the labor question. Speaking of the advent of unions among the Mexican workingmen, he said:

There has been observed on the part of the workingmen a marked tendency to organize unions and mutual corporations for the purpose of acquiring strength which they consider necessary for imposing conditions on their employers. The Executive is willing to recognize the right of the working classes to associate themselves, provided they respect all legitimate interests, as much those of the capitalists as those of the workingmen themselves. If the right to refuse to work under determined conditions is respected, the right of others who may accept the conditions to work under them is no less to be respected. Both are the necessary and obligatory accompaniments of individual liberty. The Executive, who is resolved to respect all rights and to preserve undisturbed the public order, hopes, from the good sense and patriotism of the capitalists and of the Mexican workmen, that each may always consider the rights of the other, a condition which will redound to their own welfare and to that of the country at large.

Activity in the mining industry is indicated by the increase in the number of mining titles issued in the last six months of the fiscal year 1905-06. These amounted to 1801, against 1526 in the first half of the year, making a total of 3327 for the year, covering 57,606 hectares.

Between January 1 and June 30 there were granted 656 patents on inventions and 17 on models and industrial designs, and 471 trademarks and 52 commercial names and announcements were registered.

The President reported good progress in the work of improvements now going on at various ports and stated that the total length of railroads under federal jurisdiction in the republic now aggregates 17,446 kilometers, which, added to the 4165 kilometers of lines under the jurisdiction of the state governments, and the private lines, gives a total of 21,611 kilometers.

A large increase in custom receipts, the total revenue from this source for the fiscal year being no less than $101,000,000, was announced, the President adding that there would be a surplus of receipts over expenditures, which would be applied to the cost of the new port works now under construction.

Increase in Foreign Trade.

The figures covering the foreign trade of the republic for the fiscal year 1905-06, aggregating in value $491,789,883.81, show in an eloquent way the remarkable advance the country has made as a commercial nation within a comparatively short time. In the fiscal year 1895-96, the imports were valued at $78,700,000, and the exports at $110,000,000. Last year Mexico purchased abroad merchandise to the value of $220,651,074.49, an increase of nearly 300 per cent. in a decade. Metals, of course, are an important item in Mexico's export trade, and the figures for the last fiscal year show a steady increase in the country's contribution to the world's wealth, as indicated by the following exhibit:

Gold	$31,695,777.38
Silver	125,400,083.77
Other metals	35,613,324.84
Total	$192,709,185.99

In "other metals" were included:

Copper	$28,655,897.35
Lead	4,967,866.23
Antimony	1,039,080.96
Zinc	336,234.99

The United States continues to occupy the most important position as a factor in Mexico's foreign commerce—it may almost be said to monopolize that commerce. In the fiscal year just closed the United States sold in this market merchandise valued at more than seven times the total representing the value of goods imported from Germany, its closest European competitor, and took of this country's exports nearly five times as much as did Great Britain, Mexico's best customer on the other side of the Atlantic.

The chief countries from which imports were drawn and to which exports were sent are here shown for 1905-06:

Imports from		*Exports to*	
United States	$145,600,313	United States	$186,010,052
		Great Britain	41,672,873
Great Britain	20,344,643	Germany	20,523,156
France	16,383,255	France	8,010,279
Spain	7,595,531	Belgium	7,266,821
Austria-Hungary	1,163,576	Cuba	4,028,996
Belgium	2,543,642	Spain	2,201,295
Italy	1,274,248		

With the further extension of the railroad systems, the increasing activity in the mining industry, the better methods employed in soil cultivation, and the more general diffusion of prosperity among the inhabitants, the volume of the country's foreign commerce is bound to increase still further.

The opening months of the present fiscal year have been notable for the large deliveries of railroad rolling stock, to meet the remarkable increase in freight and passenger traffic. J. J. D.

Low Carbon vs. High Carbon Ferrochrome.

The following remarks on the above subject have been received from George G. Blackwell, Sons & Co., Limited, Liverpool, England:

In the manufacture of chrome steel, including of course chrome nickel, chrome tungsten, chrome molybdenum and all other chrome alloy steels, the question of the carbon contents in the ferrochromium used is of far greater importance to the steel manufacturer than is generally understood.

The French metallurgists, who have always been very much to the front in investigating the causes of failures of certain steels, have been engaged for some time on the investigation of the variation in the results obtained from alloy steels in which chromium is used. It was found that while one steel would give excellent results at one time the same steel with exactly the same analysis, made in exactly the same way, would give bad results, and in the case of tool steel, armor piercing projectiles and similar steels the difference in the results in some cases was remarkable. These metallurgists made a series of experiments to find out the cause of these differences in the results, and have now abundantly proved that the failures are traceable to the high carbon ferrochronium used in the manufacture of these steels.

It is of course well known that the carbon present in all ferrochrome exists to a large extent as a carbide of chromium. This carbide of chromium does not all completely dissolve or alloy itself with the steel in which the ferrochrome is used, but a portion of it remains in the form of crystals of carbide of chromium, causing flaws and defects in the resulting steel. In the case of armor piercing projectiles it was found that in a great many cases the projectiles would break, and it was also found that the breaking was due to these crystals having caused flaws in the steel. In pursuing these experiments the French metallurgists had steel prepared by using the ordinary high carbon ferrochrome containing various percentages of carbon from 2 up to 9 or 10 per cent. and also from the well-known refined ferrochrome containing ½ to 1 per cent. maximum carbon, usually averaging about 0.6 per cent., and it was found that in the case of the steel made from the low carbon or refined ferrochrome such steel was perfect in every respect and there was no trouble with it, as was the case with the steel made from the higher carbon alloy. The importance of this matter to manufacturers making chromium steels cannot be overestimated, and there is no doubt that if firms manufacturing armor plates, armor piercing projectiles, tool steels and chromium alloy steels of all kinds would use nothing but the low carbon ferrochrome they would get more uniform and better results in every respect.

The use of tar as a dust preventive has not proved an unmixed blessing in England, a stretch of road so treated near Walton-on-Thames having developed marked qualities toward increasing the tendency to side slip. The tar treated surface, while highly satisfactory in the summer season, seems to be a failure in wet weather.

THE IRON AGE

1855—1906.

New York, Thursday, October 11, 1906.

DAVID WILLIAMS COMPANY, - - - - - - - PUBLISHER
CHARLES KIRCHHOFF, - - - - - - - } EDITORS
GEO. W. COPE, - - - - - - - - } EDITORS
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RICHARD R. WILLIAMS, - - - - - - - - HARDWARE EDITOR

The Transfer of the Hill Ore Lands.

That the United States Steel Corporation and the Great Northern Railroad interests have agreed in detail on the terms under which leases of the Minnesota iron ore lands of the latter pass to the Steel Corporation is a fact of prime importance to the American iron trade. The long negotiations have been more talked about, perhaps, than any other development in our iron making history save the formation of the Steel Corporation itself. Their conclusion is signalized by no change in the iron market; the outcome was too long expected for that, and in general the terms were too well known. But the transfer of the largest ore tonnage ever involved in a single transaction and on a high level basis of royalty may well be conceived as marking an epoch and as involving consequences not readily catalogued at the moment.

The terms of the contract so far as they are now available are given on other pages. They establish the present worth of all the so-called Hill ores of a certain standard at 85 cents in the ground. Beginning with 750,000 tons an addition of 750,000 tons a year is made each year to the minimum output until 8,250,000 tons is reached, which would be in 10 years, and this amount is the minimum thereafter. All ore carries a 4 per cent. interest charge on its valuation from the year after the signing of the contract until it is taken from the ground. That is to say, the yearly increment in price on the standard or 85-cent ore is 3.4 cents. An 80-cent freight to upper lake dock is paid to the Hill road on all ore throughout the life of the contract.

Two aspects of the deal are naturally thought of: first, its consequences to the Steel Corporation; second, its consequences to the iron trade at large. The argument from the standpoint of the Steel Corporation is familiar. In securing the largest deposits of Lake Superior ore held by a single interest apart from itself it has made an important addition to the number of years of operation guaranteed to its blast furnaces and steel works by the lake ores it previously controlled. With the Hill ore lands in other hands and the supply properly conserved the Steel Corporation might have come upon a day when its supremacy would be disputed. It has paid no small price to the Great Northern for the privilege of taking all the ore the latter has to offer. Had leases been negotiated to a number of steel companies as well as to merchant ore firms the price paid would have been presumably more nearly in line with the earlier leases of Hill properties, with a certain addition due to the change in the relation of ore supply and demand in recent years. But the one outstanding fact in this connection is that the Steel Corporation was the only possible buyer having sufficient low cost ores to allow it to think of taking on so heavy a tonnage at the highest record price. The transaction is thus a direct result of consolidation in the American iron trade, the United States Steel Corporation combining in itself an unparalleled ability and an unparalleled necessity.

It is evident that the officers of the Steel Corporation saw a great ultimate benefit from acquiring the Hill ores, since the contract they have made means an increase in the cost of steel to the corporation from the day the first of the Hill ores are dropped into its blast furnaces. At the beginning there will be much cheap ore with which to dilute the dearer. As time goes on, in the first decade of the contract at least, the dear ore will show increasingly in the mixture. After 10 years, as the tonnage of high priced ore remains constant, the expected increase in total, through the expansion of our iron trade, will reduce the effect of the Hill percentage. It is to be expected that the Steel Corporation will cut down the length of the interest bearing period to a minimum by taking out the newly acquired tonnage, whether it be 200,000,000 or 600,000,000, as rapidly as possible, for the interest it now pays on its own original ore properties is on a much lower scale of values.

Apart from its bearing upon the United States Steel Corporation, one of the most obvious effects of the ore deal will be the marking up of iron ore values all along the line. The largest outside holder of Lake Superior ores has asked, and the largest consumer of such ores has agreed to pay, a royalty well above the average under which lake ores are now being mined. The whole transaction is based on the belief that the bulk of the iron ore in the United States that can be carried at reasonable freights to advantageous assembling points for fuel and ore is known to-day; and further, that if other ore deposits are found they will be at such distances from the chief steel making and steel consuming sections of the country as will not permit competition with 85-cent lake ores. Holders of other Lake Superior ores are not likely to accept less than the Steel Corporation has paid, and the owners of the large deposits in the South, in New York or in any part of the country have been able in the past week to mark up their assets to a new high figure.

The position of ore consumers who buy their ores in the market has not been improved by the Hill deal. It does not follow that lake ore prices will advance above the level of to-day and remain permanently high, though it has been settled by present iron trade conditions that for 1907 higher prices will be paid. The level of ore values in recent years has been quite profitable to the mining companies and there will be recessions as lean years follow years of prosperity. It need not be expected, however, that the existing term contracts for considerable tonnages, chiefly Mesaba ores, will be renewed on the present basis. If the United States Steel Corporation pays $1.65, exclusive of mining cost, for a ton of 57 per cent. Hill ore at Allouez Bay docks next year, and an advance of 3.4 cents a ton in each succeeding year, it is not to be supposed that $1.85 and $2 Mesaba ore delivered on Lake Erie dock—and 62 and 63 per cent. ores at that—will come again.

The transaction of the past week without question has improved the position of the Southern producers of foundry and basic irons in competition with the merchant furnaces of the East and the Central West. It will rest with the Lake Superior merchant ore interests to temper the new conditions to the necessities of those who buy from them. Eastern and central Pennsylvania buyers of lake ores will have a new incentive for the development of deposits nearer home, and the use of concentrates and of foreign ores may be expected to increase.

If the Steel Corporation is now in control of 80 per cent. of the ore on Lake Superior it is assured of a supply outlasting by a good many years those of its principal

home competitors. The bearing of this condition on future additions to the list of Steel Corporation subsidiaries is not to be overlooked.

The Hill ores have come to market not in response to a demand by the American iron trade for an additional ore supply. It is not a case of discovering new and needed deposits, as when the Mesaba range came forward scarcely a year too soon to make possible the marvelous industrial development in the United States in the past 10 years. The Great Northern Railroad had an important ore tonnage on which it desired to realize, and it has practically marketed its entire holdings in a day, since all untouched ore draws interest while it waits. It is easily conceivable that the Steel Corporation and the entire American iron trade might have wished that these holdings remain unmarketed for a term of years. But the Hill interests had put themselves in a position to decide that question, and from this time on they will be a partner, and no insignificant one, in the profits of American steel manufacture.

Street Railroads as Machinery Buyers.

Electric railroads are becoming more important factors in the machine tool market and are deserving of greater attention than they sometimes get from manufacturers and dealers. There is a better realization on the part of street railroad men of the value of the modern repair shop as an element of economical and efficient management, but taking the field as a whole it has not been given the attention that it deserves. It offers a profitable field of education. With the wonderfully rapid strides which the development of everything pertaining to the electric railroad has made since the very beginning of the use of electricity as a motive power it is not at all strange that certain auxiliary departments of management have had to be more or less neglected in following the main questions. Then, again, before the present era of consolidation began most street railroads were small affairs, with no great amount of working capital. There was not the money to put into repair shops and it was considered necessary to have most of the repair work done in outside shops. This is still the case with a large number of small companies, whose repair shop facilities are very meager and capable of doing only crude work. The ordinary general machine shop of a small town, or even of the cities, has small facilities for handling street railroad work. Smaller parts may be repaired or duplicated, at a cost greater than it would be if the street railroad had a shop of its own specially equipped for this class of work. Larger work, such as the re-turning of car wheels and axles, must be sent away as a usual thing, which is of course a costly manner of doing work.

A change is now coming. The smaller companies are disappearing, absorbed to form large systems which can operate complete repair shops with economy. The large interurban and suburban systems which have been built in recent years can well afford to have shops of their own. There is more money for purposes of a first-class maintenance system, and managers are striving to discover every possible means of reducing operating expenses, and one important means is in repair work. Well ordered rolling stock means less loss in itself and in road bed and rails than where repairs are permitted to wait until bad goes to worse. The element of permanent investment enters into the matter, for nowadays street railroads are ceasing to be speculative enterprises and are usually controlled by stockholders who wish to retain their investments indefinitely and who consequently are interested in avoiding the depreciation of the property.

Yet street railroad practice has not yet reached a point which demands the best possible repair shop facilities. Too many makeshifts exist. There are some exceptions, where everything in a shop is just as it should be, the equipment being selected with as much discrimination as in a modern manufacturing establishment. But as a rule the street railroad management needs some enlightening as to shop needs. A few machine tool manufacturers and dealers are awake to this condition and are specializing in a way on this class of trade. One large company has issued a special catalogue for the street railroad trade. Special machinery is not required to any extent beyond special features of the repair shop of the steam road. But certain machines meet the special requirements of the class of work which the street railroad has to do, and it is good business on the part of the machine tool man to devote attention to these features and to bring them to the attention of this branch of the trade. Certain tools are indispensable for a good repair shop. There should be a car wheel lathe, or grinder, and an axle lathe. Engine lathes are of course required, as well as a milling machine, planer, drills, grinders, bolt cutters and forges. The lists may be advantageously increased by a punching and shearing machine, power hammer, pipe cutting-off and threading machine, power hack saw, boring mill, radial drill, turret lathe and shaper. The woodworking shop should be as well equipped. Cranes are desirable, especially for lifting car bodies from their trucks. The total cost of a complete plant is large, but if equipment is commensurate with the amount of work to be done the resultant saving pays a large percentage on the investment.

Watching for Machinery Weaknesses.

There is the suggestion of possible application in the announcement of a British manufacturer of coal cutting machines of a rebate system on renewals, which includes the payment of carriage on goods returned to the works, the purpose being to collect all possible information relating to the wear or failure of parts of the machines. The theory is that the knowledge gained by an examination of parts will lead to the discovery of weaknesses and consequent improvement and modifications of design, especially in those parts which are subject to severe wear. Such a system must work out to the mutual benefit of manufacturer and consumer; of the former, because he obtains information which might otherwise be hard to get in all of its details and because he offers an inducement for new business; of the latter, because he not only receives a rebate when he substitutes new machinery for old, but he gets the benefits of improvements resulting from a careful study of the effects of usage on the parts.

It is to be presumed, however, that the advantages of the system would accrue not so much to machines whose usefulness extends over a number of years as to those whose life is naturally short. A machine tool, for instance, would ordinarily be very much out of date before its owner would think it worth while to return it to its builder for exchange, and in the interval between its purchase and its return so completely would the machine tool builder's line have been redesigned that lessons which the wear of the old machine would teach would have become valueless, so rapid is the evolution of this class of machinery. This is true of the machine as a whole. But as to parts of machines it must always be of advantage to a

builder of machinery to obtain possession of those which have to be replaced. If the part needs replacing within a short time after the delivery of the machine the builder quickly hears from it and comes into possession, whether he seeks it or otherwise, for the customer wishes to have the loss made good to him. It may happen that a weakness inherent in a whole line of machines is thus brought out and radical changes in design may become necessary. It pays to note carefully all complaints with this end in view. Too often, to be sure, the machine tool builder is imposed upon by his customer and compelled to bear the onus of an operator's carelessness. The lack of lubrication, a disregard of well established machine tool practice, or gross carelessness generally may be to blame. But lessons may be learned from such instances as these—lessons which stimulate the design of mechanisms which are nearer foolproof. This is the constant aim of modern designers, in the knowledge that the substitution of cheaper labor for the good mechanic makes it more necessary as time goes on to furnish a machine in which there is the minimum of chance that the operator may cause trouble through his personal equation, resulting in expense of repair and loss through a machine's idleness.

There are other classes of machinery which are oftentimes replaced after a short life of usefulness, as, for example, some of the textile machines. The intimate and leisurely study of the parts of a machine under such conditions and the effects upon them of usage must teach many valuable lessons. It must always be remembered that a machine which is a failure in small ways, even to the extent of sustaining a series of minor accidents due to trifling weaknesses, can do more harm to its builder's reputation than the good work of a score of perfect tools can repair. The gossip between men interested in a common line of manufacturing includes descriptions of just such instances. Quite often one hears complaint of some certain make of machine tool, based upon experience with one machine, in which the entire product of a high class work, with the best reputation for its product, is lumped in the condemnation resulting from the failure of a single tool to give the satisfaction which was expected. Perfect shop inspection pays well on this account, and doubtless a perfect system of following up all complaints and keeping track of the investigation of each would be as profitable. It may quite naturally be overlooked that an identical complaint may several times be made concerning a type of machine, unless there exists some system for keeping track of such happenings. Perhaps different men have been called upon to attend to them, or the value of the coincidence may be lost sight of in some other way, perhaps through forgetfulness. It is a safe rule that where a complaint is several times repeated there exists something which should be investigated to the bottom, in shop or drafting room, and the rule holds good in a general way in all lines of manufacturing. And it is an equally good manufacturing maxim that constant vigilance against inferior product includes watching goods after they have gone into the possession of the consumer.

The first contract to be awarded by the Hudson Companies, New York, for cars to be used in the North River tunnels, has been placed with the American Car & Foundry Company. The Hudson Companies has ordered 50 steel cars of a type similar to those in operation in the New York Subway, with the exception that they will have doors in the sides at the center of the car. The cars are to be ready for delivery in February and they are intended for the Morton street tunnel.

It is reported that Eastern capitalists contemplate the erection of a steel plant at Bessemer, Ala.

CORRESPONDENCE.

Curved Spokes for Flywheels.

To the Editor: The following is from your current issue, October 4, 1906:

> Where the flywheel of a steam or gas engine is made with curved spokes it should be mounted upon the shaft so that the outer curve of the spokes is backward. This puts the iron of the spokes into compression in transmitting the power developed in the cylinder. If the reverse position is given the flywheel the spokes are put into tension in transmitting the power, which is not good practice in cast iron construction, although the rim is unavoidably always in tension, due to stresses caused by centrifugal action. Placing the wheel as above directed increases the stress in the flywheel rim because of the reaction of the spokes, but as the rim is always made much stronger than the spokes and is not so liable to weakening due to casting strains, this is a matter of little importance.

This is like a page from the faraway past, or tantamount to giving directions respecting the proper use of tallow dips for night work in a watch factory. Seriously, there is now no justification for the use of curved "spokes" (arms?) in pulleys or flywheels made from cast metal, nor was there ever any probable advantage even in the matter of casting, assumedly for taking care of the shrinkage. The use of such a design should be a sufficient cause in itself for turning down any machine or engine to which it is applied. Perhaps our new Art Commission would be pleased with such curlicues, applied, say, to bridges and the like; but such an indorsement might be taken as all the better reason why, from an engineering and structural standpoint, it is reprehensible.

JOHN THOMSON.

NEW YORK, October 4, 1906.

Open Shops in the Foundry Trade.

The National Founders' Association publishes in a pocket size pamphlet a list of open and nonunion foundries in the United States. It is stated that the list is only a selection and does not attempt to include many foundries which are only theoretically open shops. In most cases the class of work done by the foundry is given, the statement being made that the list is published in response to inquiries received by the National Founders' Association from independent molders and coremakers who desire to secure employment in shops free from union restrictions. The distribution of the open shops by States is as follows: Alabama, 7; Connecticut, 11; Georgia, 4; Chicago and vicinity, 40; other parts of Illinois, 12; Indiana, 12; Iowa, 6; Kansas, 5; Kentucky, 2; Louisiana, 7; Maine, 2; Maryland, 2; Massachusetts, 27; Michigan, 13; Minnesota, 21; Mississippi, 1; Missouri, 8; New Hampshire, 4; New Jersey, 12; New York, 53; Ohio, 36; Pennsylvania, 50; Rhode Island, 3; Tennessee, 1; Texas, 2; Wisconsin, 23. The total in the various States is 364, and in addition 5 names are given of open shops in Ontario and 2 in Quebec, Canada. A majority of the foundries on the list have become open shops in the past year, many of them in the past five months, the additions to the open shop ranks being noteworthy in Philadelphia, Chicago, Milwaukee, Minneapolis and St. Paul.

A new six-cylinder gas engine of the horizontal opposed type, recently built in Birmingham, England, by the Wolseley Tool & Motor Car Company, has 9-in. cylinders, with a stroke of 10 in., and is rated at 140 hp. when running at 420 rev. per min. The cylinders are arranged three on each side of a single crank case, all gear shafts and cams being contained within the case. Air for the carbureters is drawn from the crank case, resulting in both ventilating the latter and removing gas leakage. The most novel feature about the engine is the method of starting, ordinary black powder blank cartridges being inserted in the firing chamber of each cylinder through a special form of breech lock having a trigger operated from the spark cam. Each cartridge is capable of producing within the cylinder about half the regular pressure, so that three of them are capable of starting the engine. Under test the engine showed an average consumption of 0.607 pint of gasoline per horsepower hour.

The Hill Ore Properties Leased.

On Friday last Judge E. H. Gary, chairman of the Board of Directors of the United States Steel Corporation, made the following brief announcement:

After long negotiations a contract has been signed for the acquisition, on a royalty basis, of the Hill ore properties (so called) by companies controlled by the United States Steel Corporation. The quantity of the ore has not been accurately determined, but it is a large body.

The price to be paid is $1.65 per ton, delivered at the upper lake docks, with an increase of 3.4 cents per ton each succeeding year. The minimum agreed to be mined is 750,000 tons for the year 1907, and increases of 750,000 tons per year until it reaches 8,250,000 tons, and thereafter it continues on that basis.

It is believed that the consummation of this agreement will result in great benefit to both parties.

As we understand it, the actual lease has not yet been signed, but the agreement to lease the property on the lines laid out has been made by the parties in interest. The lease is to cover the so-called Hill ore properties, the Longyear-Bennett lands, in which the Hill party had a half interest; the Walker and the Northern Pacific holdings.

It must be clearly and emphatically stated that the Hill ore properties leased to the Steel Corporation do not include the developed mines owned by the Great Northern interest. Mr. Hill could not and did not convey any part of such mines as the Mahoning, Stevenson and others. It is true that the Steel Corporation owns a 20 per cent. interest in the Mahoning, but the new lease has no effect on this. With the exception of two newly opened mines no actual mining operations have been conducted on the lands leased, but a considerable part of them has been thoroughly explored, while on others no serious testing has been done. A good deal of the land is outside of the limits of the ore bearing formation, as those limits have been determined by exploration.

The Lands.

The Great Northern has owned on the Mesaba range about 81,500 acres of land, of which some 20,000 acres is on the known ore bearing formation. Much of the remaining land may contain ore, for it is in the general limits of the formation. Of the 19,560 acres held by the Great Northern on the proved formation it owns in fee 16,730 acres, holds leases from the State, school and other funds to 2240 acres, and has private leases to the rest. Most of this land is west and southwest of Hibbing, though there is some as far east as the westerly part of T 58-17. Nearly the entire ore bearing formations in T 57-21, aside from the United States Steel holdings close to Hibbing, are Great Northern, and all through the towns directly west of there for 10 miles or more its holdings are predominating. In T 56-23 it holds the majority of the lands on the formation, and with the Steel Corporation, the Cleveland-Cliffs Iron Company and a few smaller owners, controls practically all. In T 56-24 and T 25 the Steel Corporation, through its purchases from Messrs. Congdon and Hartley and their Canisteo Company, fully detailed a year ago, is the majority owner, but the Great Northern, through the Walker lands, the Davis and other timber tracts, is a fair second. All these western townships, from Hibbing to the west side of T 55-25, or to the Mississippi River, are known to contain a very large tonnage, while the larger portion of the lands has not yet been explored at all thoroughly. It is on these lands that the Steel Corporation is preparing for the vast mining business which was briefly referred to in Duluth correspondence last week, both around Coleraine and in T 56-23, where it is now beginning the erection of a mining town.

John M. Longyear, formerly of Marquette, is given credit for personal holdings of 30,000,000 tons. This is very inaccurate. Mr. Longyear, in conjunction with Russel M. Bennett of Minneapolis and the Pillsbury Estate, also of Minneapolis, the latter holding an undivided one-half and Messrs. Longyear and Bennett each an undivided one-quarter; and Messrs. Longyear and Bennett in similar conjunction with the Great Northern road, do hold a tonnage larger than this estimate, probably very much larger, and all these lands go into the new deal at the same rate as the Hill holdings themselves and as a portion of the deal. But Mr. Longyear's share, unless the ore undiscovered is greater than is supposed, will not approximate 30,000,000 tons.

Northern Pacific Railroad.

The Northern Pacific Railroad lands are mixed up in this deal, and going in as from the Securities Company, formed to control those lands, after the Northern Pacific bought the St. Paul & Duluth road, extend further east, but are not of particular importance, compared with other tracts in this stupendous transaction. Ever since Mr. Hill has had a share in control of the Northern Pacific road these lands have been held inviolate from option or lease by any outside interest, and doubtless at his dictation. It has been known all the time, despite the statements from New York, that these Northern Pacific lands would form a part of the "Hill deal." They may be worth from $25,000,000 to $40,000,000, as stated, but exploration has been so slight and fragmentary that no one has any warrant for estimating their value. These were swamp lands granted the predecessor of the Duluth & Iron Range by the State some 35 years ago, and selected many years later. Mr. Hill has foreseen all the time the overwhelming importance of an aggregate of great tonnage held *en bloc*. And in this foresight has been his opportunity and his success.

Various estimates, running up into very high figures, have been made as to the ore contents of the lands leased. It is only necessary to point out that a considerable part of the ore bearing formation has not even been explored, to show that these "estimates" are the wildest guesses. When a tract has been thoroughly tested it is possible to arrive at a fair estimate of what it will yield. A number of the Hill properties have been so far proved that they can be measured up. Dwight E. Woodbridge, the Duluth correspondent of *The Iron Age*, states that on this basis not more than 100,000,000 tons has been located. This tonnage includes the Leonard, say 10,000,000 tons; the South Agnew, say 8,000,000 to 12,000,000 tons, according to what grade marks the merchantable ore; the Adams in 58-20, say 3,000,000 tons; the North Leetonia, say 4,000,000 tons; the State section, 16-56-23, say 20,000,000 tons; the Whiteside in 15-58-19, say 12,000,000 tons, and some others, mostly west. To these should be added a considerable tonnage on the Walker lands, an undivided interest in which belongs to the Corporation and a half to Great Northern, and other lands in that vicinity. These two latter descriptions are the result of recent exploration, most of it carried on this year. This does not mean that there is not more than 100,000,000 tons of ore in the Hill properties leased, but that the quantity named is now in sight. There is very much more, in all probability, and possibly there may be as much as the most sanguine guess calls for.

Practically the agreement means that the Great Northern Railroad is guaranteed 80 cents per ton on the haul from the mines to the shipping port. That is the rate now in force on all the ore carrying roads from the Mesaba and is regarded as a very profitable one, the estimated cost being usually placed at 30 cents. In view of the constant lowering in costs of railroad transportation the rate will probably seem even more brilliant 20 years from now.

The Steel Corporation pays a royalty of 85 cents per ton for standard ore. Compared with the terms under which the Steel Corporation holds the great majority of its ore properties, this is a high figure, although it has been the basis of most of the acquisitions made in recent years on the Mesaba range. The novel and somewhat startling feature of the lease is the provision that the Steel Corporation pays in addition to the royalty of 85 cents per ton interest on that figure annually at the rate of 4 per cent., or 3.4 cents per ton per annum up to the date when the ore is shipped. That interest on the valu-

ation of the ore in the ground is payable in cumulative form on the ore when it is brought to surface.

The following table shows the minimum tonnage to be mined from year to year until 1917 is reached. After that year the minimum remains stationary at 8,250,000 tons. It shows also the price to be paid to the Great Northern interest for royalty and haul to shipping port, with the annual accretion of 3.4 cents per ton. This annual accretion continues indefinitely until the properties are exhausted:

Year.	Minimum, ton.	Price per ton.	Cost to Steel Corporation.
1907	750,000	$1.650	$1.237,500
1908	1,500,000	1.684	2.526,000
1909	2,250,000	1.718	3,865,000
1910	3,000,000	1.752	5,256,000
1911	3,750,000	1.786	6,697,500
1912	4,500,000	1.820	8,190,000
1913	5,250,000	1.854	9,733,500
1914	6,000,000	1.888	11,328,000
1915	6,750,000	1.922	12,973,500
1916	7,500,000	1.956	14,670,000
1917	8,250,000	1.990	16,417,500

The price of the ore given in the above table is that for the standard, based on 59 per cent. iron contents. The royalty, however, is reduced as the quality is below that for the standard, based on 59 per cent. iron contents. The standard, in proportion to the iron contents, down to 48 per cent. Below that the royalty is a matter of negotiation, with recourse to arbitration.

The lease will contain a provision, usual in recent agreements of this character, that when the mines are not capable of yielding the minimum tonnage, modifications are made by a board of arbitration.

It is not probable that development work of the lands leased by the Corporation can be pushed so rapidly that the minimum tonnage of 750,000 tons for 1907 can be mined. Whatever deficit there may be is added to subsequent years. Wasteful methods of mining are guarded against, the mining of course being in the hands of the Steel Corporation.

Following is a history of James J. Hill's operations in iron ore lands in Minnesota, reprinted from *The Iron Age* of January 4, 1906, and which is especially interesting at this time:

Hill's First Connection with the Mesaba Range.

Great Northern Railroad connection with the Mesaba range began when James J. Hill bought the Duluth & Winnipeg Railroad some 10 years ago. That line ran from the city of Duluth northwesterly to Deer River, Minn., on its way toward Winnipeg and the grain fields of the Dakotas. Soon afterward he acquired the Duluth, Mississippi River & Northern Railroad and its associated companies and the lands held by its owners. This last was in 1899 The Duluth, Mississippi River & Northern had been built by the Saginaw lumber firm of Wright & Davis in order to carry out a contract with the Pine Tree Lumber Company, Little Falls, Minn. Wright & Davis had sold the Pine Tree Company its timber tracts in the vicinity of what was afterward the town of Hibbing—that is, in townships 57 and 58, ranges 20 and 21. They had then taken back a contract to log this timber at the rate of something like 50,000,000 feet a year and to deliver the logs in the Mississippi River at the mouth of the Swan, 35 miles south. This led to the formation of the Swan River Logging Company and the Mississippi River & Northern Railroad, the one to carry on logging operations and the other to handle the timber to the river. It so happened that Wright & Davis had bought for timber almost all the land along the Mesaba ore bearing formation from Hibbing to a point about seven miles west, and it was this timber they sold to the Pine Tree Company. They had retained the mineral rights, for the western Mesaba, around Hibbing, was then becoming known as a probable mineral center of some importance. Mr. Wright was an old man, several of his partners died rather suddenly, and since the sale to the Great Northern of the Duluth & Winnipeg, of which he had been a director, his interest in the railroad situation waned. Times were rather unsettled and he was not a miner. So Mr. Hill bought the Mississippi River Railroad, the logging company, the Wright & Davis lands and all their holdings in this region for something less than $5,000,000. It was a long headed purchase, for it has been since then returning at least 50 per cent. a year in profits directly derived from the purchase, while the indirect returns have been far more.

Iron Ore Hauling by the Hill Interest.

For some time Mr. Hill maintained the ore business of the Duluth & Winnipeg, with no great effort toward increase. The Mahoning mine was the leading shipper and in 1899 it produced about 750,000 tons. That year the road was extended easterly along the range to Virginia about 20 miles and the haul of ore from the Sauntry and other mines of the American Steel & Wire Company was secured. This company was a new factor on the Mesaba and was taking several good properties. All its ore hauling was given the Great Northern Railroad under terminable contracts. In 1900 the haul of Commodore mine at Virginia was secured. This was given the road by Corrigan, McKinney & Co. in return for an agreement to lease them the Stevenson ore body, which was located some miles west of Hibbing and was on Wright & Davis land. For some years this ore deposit had been offered almost anybody in the steel making business independent of the Carnegie and Minnesota Iron Company interests, but had been turned down by all. It is easy enough now to see how shortsighted these people were. Corrigan, McKinney & Co. mined about 56,000 tons of ore the first year from underground and then stripped the mine and the following season touched a production of 666,000 tons. Since then it has never been below 1,000,000 tons a year, and its total to the close of 1905 is about 6,400,000 gross tons, an average of almost 1,100,000 tons per annum from the inception of the enterprise. And Stevenson ore is a standard Bessemer, cheaply mined.

Result of the Formation of the Steel Corporation.

The Great Northern Railroad was gradually increasing its tonnage contracts, but was paying little attention to additional ore lands, when in 1901 the United States Steel Corporation was formed. That took in at one swoop the bulk of the Mesaba range as then discovered. Two railroads, the ore holdings of the Carnegie Company, the Federal Steel, the American Steel & Wire, the National Steel and other companies, holding both developed mines and a number of unopened but explored properties, were at once gathered together in combined ownership. That was naturally interpreted by Mr. Hill to mean that all the ore mined by the combination would be handled to the lake on one of the combination's own railroads, except where contracts otherwise provided. Many of these contracts at that time were terminable on due notice. Mr. Hill saw that this meant a definite limitation of his own ore traffic. He had already appreciated its earning capacity on a moderate annual business. He saw that to justify the immense investment required in rolling stock, terminal yards, ore piers, &c., he should have a growing and far larger traffic. This he must secure individually. He could hope for no assistance from the Steel Corporation, which had two railroads of its own, for which it would be anxious to provide a large earning power. It would not only carry its own ore, but would abrogate at the earliest opportunity what contracts had been made with him by some of its new subsidiary companies. He stood to lose the business of mines shipping to the American Steel & Wire Company, a business that in 1901 amounted to more than half a million tons. It behooved him to move at once, and he did so.

Hill Activity in Acquiring Ore Lands.

The headquarters of the Eastern Minnesota Railroad, which was the branch of the Great Northern handling its ore traffic, were located in Duluth, and Louis W. Hill, son of the president of the system, took direct charge. When Mr. Hill went to Duluth there were no maps of the mines owned by his company, no blue prints of the range and no data as to the ownership of its lands. There was little organization for the work he was to carry on, which was not only new to him, but of a character entirely different from ordinary railroading. D. M. Philbin was then superintendent of ore traffic and was of exceedingly high value from his knowledge of the ore trade in general and the local conditions in particular. Maps were made, ownerships were determined along the range, explorations were undertaken and negotiations were begun for more

traffic with independent miners and for control of additional lands.

The Great Northern Railroad was welcomed into the field. It gave competition, which had been lacking, and it aided the individual owner in disposing of his property to advantage. It was James J. Hill's opinion that the Steel Corporation would continue steadily the policy of gatheriug in ore lands that had been conspicuous in the management of the Oliver Iron Mining Company when under control of the Carnegie Steel Company. There was even more need of great stores of ore now that the Oliver Company was to supply an all-embracing combination some units of which had been but poorly protected in the matter of raw materials. The same men were in direct supervision and it was natural to suppose they would continue the same policy. But for a time this policy was changed. The new Eastern men in control were, to be sure, dominated to some extent by Wall Street ideas, and the stock end of the proposition looked bigger to them than any other, and it was necessary that there be great earnings. These must not be interfered with or eaten into by any expenditures not absolutely necessary for the immediate addition of earnings. And ore was a long-time proposition. The immense tonnage in the ground under control of the corporation looked big enough to last indefinitely. For a time too these men did not appreciate the necessity of controlling all ore possible if the main object of the corporation, that of control, was to be most easily and surely carried out.

For a time therefore Mr. Hill had free rein. Most independent steel makers had not awakened to the situation and by a strange species of fatalism seemed to believe that the Lord would provide ore somewhere for all time to come.

Advantageous Position of the Hill Interests.

The Eastern Minnesota Railroad was able to get all the money it desired for the purchase of ore lands at a low rate of interest. The credit of the Great Northern was back of it, and with its cheap money Mr. Hill was at an advantage over any competitor who might come into the field. He began to buy fees and to lease by the wholesale, but very quietly. The stocks of old companies that had been organized during the early days of the Mesaba, but had fallen into disrepute from their inability to develop their lands, were bought at remarkably low prices and the control of lands on the ore bearing formation was thus secured. Some of these companies held State lands and some of them were fee tracts. State leases were bought from their owners at advances in the actual price or in the royalties demanded. Large tracts were bought from private owners who had never carried on exploration and had little faith in their properties. These were bought if necessary on the principle of the small boys who trade in jackknives—"unsight unseen"—but they were bought cheaply and if a single mine could be found on them the cost price was a mere bagatelle.

In the meantime a large exploring business was developed and drills were put into operation at various points along the range as far east as the center of T 58-18, near the Mountain Iron mine. Agreements had been made with the Rockefeller interests some time before by virtue of which the Great Northern was not to go east of certain limits and the Rockefeller interests agreed not to extend their western purchases. The great Wright & Davis tracts running for seven miles across T 57-21 and on into R 22 were the basis for the Hill holdings, and other purchases were in a general way intended to round out this nucleus.

Jacques Thibeau of La Louviere, Belgium, in a paper published in the *Revue Universelle des Mines*, refers to the rapid progress which the use of electricity is making in the manufacture of steel. Among the recent installations operated by blast furnace gas are a furnace of 1200 hp., making 40 tons of steel per day, at Dudelange, and one each of like capacity at Forges d'Eich and at Roechlings, Voelklingen, the latter for rail steel. In five months the Société des Procédés Gin has received orders for furnaces for 4000 hp. for the Krupp Works at St. Léger, France; for 4500 hp. for Sastago, Spain; for 7000 hp. for Petrozseny, Hungary, and for 12,000 hp. for Italy.

The Size of the Lake Ore Reserves.

Certain figures published in New York in the past week as to relative holdings of Mesaba range ores by the various steel making interests are quite incorrect. Naturally it is impossible to make anything like close estimates, for none of the owners of ore lands is any too willing to state his holdings, and in the second place none of the larger owners has a correct idea of what he may own. This is especially true of the largest ones, whose holdings include immense tracts of undeveloped lands. The table published in New York on the alleged authority of "an officer of the Steel Corporation" is so erroneous as to be unworthy the slightest attention. The Steel Corporation is much underestimated. The Cambria Steel Company, with 52,000,000 tons, is also below the mark. It has a good deal more than that on the Mesaba alone. W. P. Snyder's reserves are put at 22,000,000 tons. He has practically that amount in one Mesaba mine, and controls several of them. Twenty-five million tons for Corrigan, McKinney & Co. may possibly be somewhere near right, though doubtless rather low. Jones & Laughlin have just about twice the 21,000,000 tons credited them, and this on the Mesaba range alone, while they have mines on two other ranges. I am afraid that Rogers, Brown & Co. will not appreciate the perhaps unconscious irony that classes them in the 10,000,000-ton list. They should be put well up with Jones & Laughlin.

The Cleveland-Cliffs Iron Company, at 35,000,000 tons, including its Marquette range holdings, is far too low. I should guess at 50,000,000 tons as a round figure for conservative estimates. This company owns half the Negaunee and Maas, the Ashland, all the Princeton District except some explorations, and a little Mesaba. Pickands, Mather & Co. at 20,000,000 tons and the Lackawanna Steel Company at 8,500,000 tons are also a long way under the mark. The Lackawanna holdings, including its interests with Pickands, Mather & Co. and the Cleveland-Cliffs, should be well up to what both firms are credited with in the estimate referred to. The Lackawanna half interest in Negaunee mine and in Maas, its interests in several companies with Pickands, Mather & Co., and its State lease on the Scranton property in Minnesota—this latter alone good for about 15,000,000 tons—put the company many times above what it is credited with. The Pickands, Mather & Co. ownership of mines is now very large, especially on the Menominee range, where they have recently added materially to their holdings. On the eastern Mesaba, too, they have been busy acquiring mines and have a large tonnage there, near Hibbing and at Eveleth. The Republic Iron & Steel Company is credited with but 8,000,000 tons, but 25,000,000 to 30,000,000 tons would be approximately correct. The Cherry Valley Iron Company at 6,000,000 tons and the La Belle Iron Company at 7,000,000 tons are similarly underestimated. In addition to all the above are numerous merchant ore firms, such as Oglebay, Norton & Co.; M. A. Hanna & Co.; Ferdinand Schlesinger, Joseph Sellwood, and Ladenburg, Thalman & Co., whose gross tonnage is easily 100,000,000 tons.

The figures referred to above estimate the total holdings of all the interests named at about 2,000,000,000 tons, of which the Steel Corporation and the Great Northern are given 1,750,000,000 tons. My own idea is that the tonnage in sight on Lake Superior now owned or controlled by the Steel Corporation considerably exceeds the figure given for everybody, while the others mentioned have at least 500,000,000 tons. It should be remembered, too, that old ranges have not been explored to precision and completeness, and there are probably many millions of tons yet to be found on the Mesaba. D. E. W.

The instructors at the Winona Technical Institute, Indianapolis, Ind., find themselves handicapped for want of text books on the different trades being taught there. They say that the field of text book literature for trade schools is practically untouched and that such books should be written by men who have had practical training for long terms in shop service.

OBITUARY.

C. M. BALL.

Clinton Manning Ball died at his home in Rockaway, N. J., September 10, at the age of 63 years. Mr. Ball was the son of Erastus and Rebecca Hill Ball and was born at Hoosic Falls, N. Y., October 3, 1843. Early in life he removed to Utica, and much of his boyhood days was spent in the home of his stepfather, Rev. Theodore Spencer, D.D., a well-known Presbyterian clergyman. He received his education at private schools in Williamstown, Mass., and Gloversville, N. Y. He passed through Hamilton College in the class of '64 and began business in Detroit, Mich., but returned to Utica, where he became a member of the firm of Baird & Ball, after which he became senior partner of the firm of Ball Bros., Troy, N. Y., custom shirt manufacturers.

Although he attended no institution devoted to the study of electrical science, he was at an early age attracted by and interested in that subject, and in the year 1877 he had on exhibition in his factory in Troy the first system of electric lights in a multiple circuit. On November 23, 1878, he made application to the Patent Office for a patent on this invention, and on November 2, 1880, patent No. 233,831 was granted to him. This patent foreshadowed and had an important bearing on multiple series distribution, particularly as applied in the art of incandescent electric lighting, electric car service, telephones, &c. Indeed, in this patent is found the foundation work of what has popularly come to be known as the three-wire system of distribution; but while his drawings and specifications showed the fundamental features of the invention, his patent attorney seemed to be unable to grasp the great importance of the matter he had in hand, and through improperly drawn claims Mr. Ball was denied the great material recognition to which he was entitled.

In 1881, in London, England, Mr. Ball received the only awarded medal for electrical exhibits as illustrated by the Whitehouse Electrical Company. He received the Gold Medal from the Paris Exposition of 1882 for a dynamo, and other medals for other inventions.

At the time of his death Mr. Ball was consulting engineer to the Auto Improvement Company, New York, and while he contributed largely to the perfecting of many electrical and mechanical devices of importance in this industry, this work was in a measure overshadowed by the assistance he gave and the success he attained for them in perfecting a safe system for storing acetylene gas under high pressure. Devoting but a small part of his time and attention to this matter for a period of about 18 months, he had rendered absolutely obsolete the old method of a portable generator with its unreliability of operation, freezing of water, clogging from lime and tarry deposits, by evolving a safe system of stored acetylene whereby the gas will be pure, dry and always ready for use, and by the simple opening of a valve furnish light to any number of burners.

In 1888 he began in Boston, Mass., the manufacture of the only incandescent lamp ever produced which increased in candle power and efficiency with use. He relinquished this business to give his personal attention to the concentration and refining of iron ore, and unless the formula for making the lamp may be found among his private papers the secret is lost to the world.

In 1887, together with two associates, he took up iron ore concentration and established at the Benson mines, St. Lawrence County, N. Y., the first magnetic ore concentrating plant ever put into successful commercial operation. The concentrating plant at these mines had a capacity to treat 2000 tons of ore every 24 hr. He was associated also with the operations of Witherbee, Sherman & Co.'s mines at Mineville, N. Y., and with the plant at Rittenhouse Gap mines, Pennsylvania.

Important as these operations were, Mr. Ball felt that he had not reached the highest point in the art. With the separators heretofore constructed it was necessary to crush the ore to four mesh (¼ in.) or smaller, but Mr. Ball believed he could construct a machine capable of treating much larger pieces, thus materially reducing the cost of the operation, and some six or seven years ago he installed such a machine at the Hibernia mines, New Jersey, capable of treating ore crushed to pass a 2½-in. ring; so successful was this plant that it led to the erection of three or four others at the same mines.

Having achieved so much, Mr. Ball was not yet satisfied, for he believed he could go yet one step further and crown his previous successes with a feat more brilliant than all the others. The machines heretofore constructed were for the purpose of treating magnetic ore (magnetite), but this is only one of the many great classes of ore, such as specular, red and brown hematite, &c., which have all been classed as nonmagnetic ores, and which constitute the larger portion of the ores of iron. All of these are absolutely unresponsive to the machines previously constructed, but Mr. Ball was confident that he could construct a machine to which many, if not all, of these ores would respond as readily as magnetite did to the other machine, and shortly before his death he completed a commercial machine which treated specular and other so-called nonmagnetic ores successfully. Mr. Ball then turned his attention to the question of converting the ore into metallic iron, and to this end he had plans made of a method which he claimed would produce pig iron from the ore at from $1 to $1.50 per ton cheaper than the present methods.

Mr. Ball's son, Guy S. Ball, who is now nearly 40 years of age, and who had been associated with his father for some years, together with an early associate of his father, purposes taking up the work and endeavoring to bring his plans to full fruition, and it is to be hoped that he has left such drawings and information relating to his latest inventions as will enable them to give the world the benefit of them.

Mr. Ball was married September 15, 1864, to Anna Augustus Smith, Bleeker, N. Y., who survives him, with two sons, Guy S. and Clinton M. Jr., and two daughters, the Misses Alice S. and Harriet E. Ball. His only brother, John C. Ball, still resides in Troy, N. Y.

JOHN W. TEDFORD, vice-president of the Sharon Steel Hoop Company, Sharon, Pa., died suddenly October 7, aged 47 years. Mr. Tedford was born in Mount Vernon, Iowa, and during his early life was actively identified with railroad executive work, where he became widely known and made a fine reputation. Some 10 years ago he was the commercial agent of the Atchison, Topeka & Santa Fe Railroad in Pittsburgh, but later went to Chicago to become first assistant to the general freight agent. His executive ability was marked and he soon became one of the valued officials of the road, with which he was connected in various capacities for about 21 years. In March, 1903, he went to Sharon to take a position in the sales department of the Sharon Steel Hoop Company. Here he again proved his ability and was rapidly advanced to the position he held at the time of his death.

HENRY CHESS, a retired manufacturer of nails and tacks, and one of the pioneer manufacturers of Pittsburgh, died at his home in that city October 6, aged 71. Mr. Chess was born on the South Side, Pittsburgh, and was a resident of that city all his life. As a boy he was employed in a number of mills on the South Side, and finally embarked in business on his own account, retiring from business some years ago. He is survived by his widow and two brothers, Harvey and Walter, who are actively connected with the Central Expanded Metal Company, Pittsburgh.

SAMUEL J. CHAPMAN, secretary and treasurer of the Manistee Iron Works Company, Manistee, Mich, died September 14.

JOSEPH H. GLIDDEN, the inventor of barb wire fencing, died October 9 at his home in De Kalb, Ill., aged 93 years.

WM. H. NELSON, of Manistique, Mich., died October 4, at Knowlton Hospital, Milwaukee, Wis., where he had been under treatment for five weeks for heart trouble. Mr. Nelson was superintendent of the Champion Furnace Company at Manistique. He was 65 years of age, and is survived by one daughter.

Pig Iron Production Increasing.

A Good Gain in Active Capacity.

September gave a check to the decline in the rate of pig iron production, which has been in progress since the high record output of March. In the 30 days of September the coke and anthracite furnaces of the country produced 1,970,962 tons, as against 1,926,736 tons in the 31 days of August. The daily rate was thus 65,699 tons in September, as compared with 62,153 tons in August. Further relief from the strain of recent weeks is to be expected this month, since with resumptions that came in the latter part of September, October opened with an active capacity of 469,665 tons a week for 311 coke and anthracite furnaces, as against 441,426 tons for 302 furnaces on September 1. This would mean about 120,000 tons more of pig iron a month.

The steel companies increased their production in September by 26,895 tons over August and the merchant furnaces made a gain of 17,331 tons.

The table below gives the production of the coke and anthracite furnaces in September, as compared with the records for the preceding four months:

Monthly Pig Iron Production.—Gross Tons.

	May. (31 days)	June. (30 days)	July. (31 days)	August. (31 days)	September. (30 days)
New York....	134,048	129,834	141,885	138,697	140,105
New Jersey..	35,973	32,858	34,814	35,058	34,849
Lehigh Valley.	53,613	49,704	51,761	51,979	50,946
Schuylkill Val.	48,760	56,921	52,751	47,940	48,245
Lower Susquehanna and Lebanon Val.	57,951	60,219	61,132	64,145	63,968
Pittsburgh dis.	509,777	487,900	505,570	457,002	460,903
Shenango Val.	176,913	157,313	150,116	133,984	138,843
West. Penn..	112,985	100,505	103,733	94,874	98,237
Md., Va. and Kentucky....	77,069	75,016	73,888	77,647	78,654
Wheeling dis..	104,109	93,618	101,573	107,526	102,364
Mahoning Val.	147,433	149,943	161,073	136,415	149,635
Central and North. Ohio.	168,672	149,944	147,162	155,455	152,730
Hocking Valley and Hanging Rock	36,103	33,559	31,643	34,276	31,383
Ill.,Mich.,Minn., Wis., Mo. and Colo.	255,256	236,528	232,954	218,725	244,403
Alabama	137,790	124,606	127,165	130,771	132,554
Tennessee, No. Caro., Texas and Georgia.	42,294	38,265	36,182	42,242	43,143
Totals....	2,098,746	1,976,733	2,013,402	1,926,736	1,970,962

To each of the above totals should be added about 35,000 tons, representing the monthly output of the charcoal furnaces of the country.

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of products month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1904.	1905.	1906.	1905.	1906.
January	502,994	1,129,042	1,358,015	21,002	26,305
February	756,260	1,027,937	1,226,760	22,431	26,988
March	913,412	1,232,255	1,400,395	21,280	23,595
April	974,006	1,222,710	1,333,591	20,038	28,054
May	927,534	1,287,438	1,372,423	24,732	29,447
June	788,882	1,149,404	1,293,437	21,761	22,737
July	694,892	1,114,409	1,323,391	31,220	20,153
August	747,570	1,186,050	1,237,485	27,461	18,327
September	936,494	1,262,033	1,264,380	21,645	24,078
October	971,447	1,370,960	.....	26,799	.....
November	962,384	1,334,644	.....	23,776	.....
December	1,019,841	1,356,962	.....	29,481	.....

Among furnaces blown in in September were Franklin in New York; the new Palmerton stack of the New Jersey Zinc Company in the Lehigh Valley; one Carrie, one Donora, one Edgar Thomson Spiegel and Midland in the Pittsburgh district; Claire, Fannie and South Sharon No. 1 in the Shenango Valley; one Cambria and Punxy in Western Pennsylvania; No. 2 Ashland in Kentucky; one Lorain, Ohio, of the National Tube Company; one Calumet and the new Joliet No. 4 in Illinois; Mattie and Ohio No. 4 in the Mahoning Valley; Bessemer No. 3 of the Tennessee Company in Alabama. Of furnaces blown out we mention one Swede in the Schuylkill Valley, one Bethlehem in the Lehigh Valley, Atlantic in the Shenango Valley, one Monongahela in the Pittsburgh district, Princess in Virginia, Newburgh in the Cleveland district, Niles in the Mahoning Valley, Central in Alabama and Napier in Tennessee. In the Hanging Rock district the Marting Iron & Steel Company blew out one of its alternate stacks in September and started the other on October 1. The table below gives the active capacity per week of furnaces producing coke and anthracite iron on October 1 and September 1, 1906:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	—October 1.— Number in blast.	Capacity per week.	—September 1.— Number in blast.	Capacity per week.
Buffalo	13	13	27,532	13	26,880
Other New York...	10	5	5,220	4	3,929
New Jersey.....	8	7	7,964	7	7,886
Spiegel	2	1	167	1	160
Pennsylvania:					
Lehigh Valley.....	27	18	10,288	18	11,440
Spiegel	3	3	670	2	300
Schuylkill Valley...	13	11	11,257	12	11,230
Low. Susquehanna.	8	5	7,009	5	6,512
Spiegel	2	1	631	1	627
Lebanon Valley....	10	9	6,696	10	7,571
Spiegel	1	1	590	0	0
Pittsburgh District.	43	41	107,677	38	100,688
Spiegel	2	2	2,354	3	2,506
Shenango Valley...	20	18	34,696	16	30,263
West. Penn.....	24	18	22,863	16	20,032
Maryland	5	3	7,049	3	5,984
Wheeling District....	14	13	23,885	13	23,481
Ohio:					
Mahoning Valley...	16	15	37,046	14	31,724
Cent. and Northern and Michigan....	20	19	39,025	19	36,083
Hocking Valley and Hanging Rock...	12	12	8,112	12	7,749
Illinois	21	20	43,089	20	40,441
Spiegel	3	2	1,276	1	550
Minnesota	1	1	1,252	1	1,028
Wisconsin	5	5	4,985	5	5,020
Missouri	1	0	0	0	0
Colorado	4	4	6,032	4	6,161
Spiegel	1	0	0	0	0
The South:					
Virginia	23	13	9,218	14	10,426
Kentucky	7	4	2,718	3	2,437
Alabama	46	30	30,848	29	31,125
Tennessee	18	15	8,970	16	7,893
Georgia and Texas.	2	2	1,136	2	1,300
North Carolina....	1	0	0	0	0
Totals.....	386	311	469,665	302	441,426

For a series of months the active coke and anthracite capacity fluctuated as follows, in gross tons:

	Capacity per week.		Capacity per week.
October 1.....	469,665	May 1.....	368,244
September 1.....	441,426	April 1.....	337,257
August 1.....	449,908	March 1.....	308,751
July 1.....	460,570	February 1.....	273,692
June 1.....	472,622	January 1, 1904.....	185,636
May 1.....	484,031	December 1, 1903....	244,156
April 1.....	484,240	November 1.....	273,715
March 1.....	479,737	October 1.....	353,142
February 1.....	482,156	September 1.....	360,197
January 1, 1906.....	463,673	August 1.....	353,681
December 1, 1905....	475,814	July 1.....	384,825
November 1.....	460,449	June 1.....	388,178
October 1.....	445,468	May 1.....	373,496
September 1.....	412,563	April 1.....	386,215
August 1.....	410,088	March 1.....	347,424
July 1.....	408,617	February 1.....	335,239
June 1.....	443,092	January 1, 1903.....	346,073
May 1.....	452,031	December 1, 1902.....	336,617
April 1.....	439,564	November 1.....	330,110
March 1.....	403,157	October 1.....	337,837
February 1.....	405,792	September 1.....	328,243
January 1, 1905	377,879	August 1.....	328,745
December 1, 1904....	357,846	July 1.....	303,793
November 1.....	334,249	June 1.....	337,492
October 1.....	319,249	May 1.....	337,627
September 1.....	291,573	April 1.....	331,140
August 1.....	246,092	March 1.....	316,039
July 1.....	272,301	February 1.....	325,440
June 1.....	336,107	January 1, 1902.....	291,992

The Duration of the "Cycle of Prosperity."

In the October *Atlantic Monthly* Alexander D. Noyes, financial editor of the New York *Evening Post*, writes of "Commercial Panics, Past and Future," discussing at length the nature and origin of the well-known panics and depressions in the United States. After describing the features of the panics of 1837, 1857, 1873 and 1893 and their causes the writer passes to present financial and industrial conditions and treats as follows of the outlook:

What, then, in the light of our examination of the causes underlying commercial panics are we to say of the outlook for the future? Exactly where does America stand to-day in the "cycle of prosperity"? Must we look for the final extravagances in use of credit which have brought disaster in other "20-year periods," and for the commercial panic which ensues; and, if so, when is that episode to be expected? These are highly practical considerations.

Numerous conditions and circumstances peculiar to the present forward movement in finance and industry and differing widely from the phenomena of former periods have encouraged at times, notably during the excitement of 1901, belief that the precedent of other decades might not be repeated. Much has been made of the facts that between 1897 and 1900 this country had redeemed its foreign debt on an unprecedented scale; that in the last-named year our money market was itself a creditor of Europe and an investor in European public securities; that our excess of merchandise exports has reached unheard of figures—$664,000,000 in 1901, and an average of $513,000,000 per annum for the past nine years, as against a previous annual high record of $286,000,000; that our interior communities have themselves become independently wealthy, lending money in the Eastern markets instead of borrowing from them; that the currency is in a sound condition, as it certainly was not on the eve of 1837 or 1857 or 1873 or 1893. Finally there is cited wholly unprecedented annual gold production of the world as a whole and of the United States alone, both of which reached a maximum last year.

Where History Has a Bearing.

These are facts with an important bearing on the country's power to withstand reaction from an overexploited credit. That they can, however, alter permanently the law of financial inflation and depression whose repeated operation we have traced is not reasonably to be supposed. Arguments very similar might have been used, and indeed were used in the decades before 1893 and 1873, to prove that recurrence of the old-time commercial panic was impossible. Belief in a radically changed condition of American finance and industry was an important factor in the excited "booms" which preceded all our years of crisis and reaction. In the fifties our gold discoveries guaranteed the American situation; in the seventies we had suddenly become the grain producer for the outside world. Yet neither event, though each was equivalent to an industrial revolution, delayed for a year the arrival of the commercial crisis after the familiar interval.

The reason is simple. In the periods referred to the greater the genuine basis of prosperity the larger the balloon of inflated credit blown by the speculators and promoters. People who are inquiring whether another commercial crash, as a sequel to the present "boom," is or is not a probability of the future, ought to devote their investigation not alone to the underlying elements of strength, but to the manner in which those elements have been exploited. If it were to be discovered that credit had been employed prudently and conservatively, that fictitious values had been discouraged and that the community as a whole had not been indulging in speculation there would then exist reasonable ground for arguing that the experience of past commercial panics might be escaped.

Some Specifications of Unsoundness.

It will hardly be alleged that the past five years have presented any such picture. Unparalleled as were the tokens of sound and real American prosperity the fabric of paper credit built upon it even surpassed in magnitude and extravagance anything of the sort that the world had previously witnessed. Details are hardly necessary; to enumerate them would be to tell our financial history since 1898. Speaking generally, what has happened is that American industry as a whole has been recapitalized within this period on a basis of immensely extended debt. The country has been speculating, sometimes with extraordinary rashness, in the shares of these and the older corporations; in this race for speculative profits some of the strongest private banking houses and some of the largest banks, directly or indirectly, have been engaged.

There have not recently been repeated all the excesses of 1899, when a great industrial company inflating its capital from $24,000,000 to $90,000,000 disposed of $26,000,000 in such ways that the courts could not afterward learn what had become of it; or those of 1901, when $50,000,000 cash was paid to the Steel Trust "Underwriting Syndicate" merely for guaranteeing the sale of the company's new stock. But we have seen the Wall Street stock market within a year jacked up to extravagant figures by the virtual cornering of properties with $150,000,000 stock—this being done mainly with borrowed money at a time when supplies of available capital were visibly running short. With all the outpour of wealth in American industry the country's capital has on at least three recent occasions shown itself inadequate to the home demand upon it. Wall Street has seen good commercial paper at these times selling at 8 per cent., short time loans at the equivalent of 12 per cent., and demand loans at 125 per cent.

A few years ago it was estimated in banking circles that the American market possessed a floating credit of not less than $200,000,000 at the foreign money centers. We have very lately been in debt to these same markets, on our bankers' notes of hand, to a probably much larger sum. When railroad companies in unquestioned credit were unable this past year to sell their bonds save at a heavy sacrifice and were forced to borrow on their notes at high rates and for short maturities capital borrowed from European and American banks was used for concerted manipulation of Stock Exchange securities; the operation was continued at the very moment when some of the exorbitant money rates just cited were in vogue.

A Crisis Not Considered Imminent.

I do not state these facts with a view to moralizing or distributing the blame; nor have I any idea of predicting an early and serious commercial crisis. There are many reasons why no such event is considered imminent. But we are looking at our financial history past and future at long range; and what one must admit in the light of these quite undisputed facts is that financial America has in the past half dozen years simply repeated the general story of those preceding "booms" which ended in commercial crisis. That we shall some time—probably at a date sufficiently remote—witness another violent spasm of financial readjustment, such as 1893 or 1873, seems to me to be altogether probable.

Certainly if our study of causes of commercial panics proves anything it proves them to be a logical result of exactly such procedure as has distinguished the American markets for half a dozen years. We have no good reason for assuming that in the end a similar result will not follow the similar causes in the present period. It has indeed been not a little impressive to see how, even with the new and portentous influences at work in the present cycle of prosperity, its successive stages at the usual interval have repeated the history of preceding epochs of the kind.

We have even had our "little panic," which traditionally comes midway between two larger commercial crises, and we have had it at the traditional interval. Such a year of Stock Exchange disorder, only partly accompanied by disordered trade, occurred in 1866 and 1884, and it occurred again in 1903. Whether the "20-year interval" between the first-class panics is to be as scrupulously observed—its exact observance would bring the next one in 1913—is a question for the prophets.

NEWS OF THE WORKS.

Iron and Steel.

Mattie Furnace of the Girard Iron Company, Girard, Ohio, was blown in September 25.

Niles Furnace of the Carnegie Steel Company blew out September 6. No. 4 Ohio Furnace of the same company was blown in September 12.

The Anderson, Ind., plant of the American Steel & Wire Company has added to its products wire fencing. The wire and nail departments will be kept up.

The new No. 4 furnace in the Joliet group of the Illinois Steel Company was blown in on September 12.

Of the two alternate stacks of the Marting Iron & Steel Company, Ironton, Ohio, Alice Furnace was blown out on September 11 and Blanche Furnace, which has been under repair for some time, was blown in on October 1.

It is now expected that the Hudson Iron Company will blow in its furnace at Secaucus, N. J., about October 15.

No. 1 Swede Furnace of Richard Heckscher & Sons Company, Swedeland, Pa., blew out September 10.

South Sharon Furnace No. 1 of the Carnegie Steel Company was blown in September 12.

Adrian Furnace of the Adrian Furnace Company at Du Bois, Pa., was blown in September 5.

The furnace of the Punxsutawney Iron & Steel Company, Punxsutawney, Pa., was blown in September 25.

Princess Furnace, at Glen Wilton, Va., was blown out September 19.

No. 2 furnace of the Ashland Iron & Mining Company, Incorporated, Ashland, Ky., was blown in September 26 on high silicon foundry iron.

No. 1 furnace of the South Chicago Furnace Company, South Chicago, Ill., was blown in September 22, after being out for six weeks for repairs.

Carrie Furnace No. 4 of the Carnegie Steel Company, Rankin, Pa., was blown in on September 26, after having been idle for the past 10 weeks for relining and repairs.

The new Bessemer steel plant, sheet and tin bar mills of the Youngstown Sheet & Tube Company, Youngstown, Ohio, are working very satisfactorily and are turning out very creditable tonnages. This company is now erecting a large office building near its works, which it hopes to occupy early in the year.

Furnace B of the National Tube Company, McKeesport, Pa., has been blown out for relining and extensive repairs.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has received an order from the Glengarnock Iron & Steel Company, Limited, whose plant is in Ayrshire, Scotland, for a mixer of 250 tons capacity, which will be installed at its steel works.

The sale of the Lookout Mountain Iron Company's property, including Battelle Furnace at Battelle, Ala., about 14,000 acres of mineral lands, rolling stock and machinery, which was announced for October 1, has been postponed to November 5.

J. H. Volkommer & Co., contracting engineers, Empire Building, Pittsburgh, have received a contract for building a steel plant for the North American Steel Company at Bellington, W. Va. The contract includes an extension to the present rolling mill which will be about 100 ft. wide, including lean-tos, also a building which will be about 60 ft. span, 200 ft. long, with lean-tos on each side and which will contain an open hearth steel plant having two 30-ton open hearth furnaces. There will also be a boiler house 35 x 90 ft. Volkommer & Co. are also engineers for the Wheeler Reflector Company of Boston, Mass., in the building of a new plant, which the latter is erecting for the manufacture of steel reflectors. The firm is also engineer for several other plants now in course of erection.

The Susquehanna Iron Products Company has been incorporated with a nominal capital to succeed to the business and property of the Susquehanna Iron & Steel Company, Columbia, Pa., under the plan of reorganization. The capital stock will later be increased to $750,000 seven per cent. cumulative preferred, and $2,000,000 common stock.

General Machinery.

The Stephens-Adamson Mfg. Company, Aurora, Ill., is enlarging its plant by the erection of an additional building, 80 x 200 ft. This will be used as a blacksmith and steel shop. Tools for its equipment have been purchased.

The Modern Concrete Machine Company has been incorporated at Terre Haute, Ind., with $50,000 capital stock. The directors are D. W. Henry, A. E. Harper and W. T. Gleason.

The Novelty Iron Works, Dubuque, Iowa, reports an unusual volume of orders for power hammers and punches and shears. Export trade has considerably increased and recent orders have been received from Mexico, Canada and Japan.

The El Paso Foundry & Machine Company, El Paso, Texas, has increased its capital stock from $200,000 to $300,000, and will use the added stock in the building of a new plant. Thirty acres of land have been purchased within the city limits and work has been started on the construction of buildings, the dimensions of which will be as follows: Boiler shop, 70 x 280 ft.; foundry, 70 x 200 ft., and machine shop, 100 x 200 ft. A large warehouse will also be built for the supply business. The old plant of the company has become inadequate to handle business.

The Crescent Machine Company, Leetonia, Ohio, manufacturer of woodworking machinery, advises us that orders are very plentiful, and that its trade during the past year has been larger than ever before. The rapidly increasing trade of this company has made it imperative to secure larger quarters, and it will soon complete the building of an entirely new plant, which it expects to occupy about January 1. Considerable new equipment will be needed for this plant, which will increase its output from 50 to 75 per cent., and the company will take up the manufacture of several new lines of machines.

Zeh & Hahnemann, Newark, N. J., have erected a brick and steel building at Vanderpool street and avenue A, the main floor containing 5000 sq. ft., one-half used as a machine shop and the other half as an assembling floor. The machine shop is equipped with modern machine tools and a traveling crane. On two sides of the building is a gallery containing 2500 sq. ft. of floor space, in which is installed machine tools. This new building more than doubles the firm's former capacity for the manufacture of presses, dies and automatic machinery.

The Forsyth Mfg. Company, Buffalo, N. Y., is ready to consider the transmission equipment which it will require for its new plant, plans for which are nearly completed.

The W. P. Lucas Company, Oil City, Pa., will build a modern machine shop for the manufacture of automobiles, automobile parts and machinery.

The York Mfg. Company, manufacturer of ice making and refrigerating machinery, York, Pa., is completing a one-story addition to its foundry, 62 x 106 ft., and is getting ready to put in the foundation for an addition to its pipe shop, 67 x 226 ft. This latter building will be of the same construction as the foundry, having concrete foundation, brick walls and wood roof. All material for this building has been contracted for.

The Johnetta Foundry & Machine Company will make an application for a charter the latter part of this month, to carry on a general foundry and machine business. The parties named in the application are J. H. Price, D. C. Eaton and Stephen Stone, all of Pittsburgh, Pa.

Samuel W. Hay Sons' Company, Farmers' Bank Building, Pittsburgh, has taken the agency for the sale of the Steele-Harvey crucible melting and refining furnace, made by the Monarch Engineering & Mfg. Company, Baltimore. The company has sold several of these furnaces in the Pittsburgh district in the past few weeks. It has also sold a 10-ton locomotive crane to the Petroleum Iron Works Company, which is building a new plant at Sharon, Pa., and has taken a contract for coal and sand elevating machinery equipment for the D. J. Kennedy Company, Pittsburgh.

Power Plant Equipment.

Bids will be received by S. M. Cowan, superintendent of the U. S. Indian School, Chilocco, Okla., until October 25 for furnishing a 200-hp. water tube boiler, 120-hp. engine, 80-kw. dynamo and other electrical apparatus.

The city of Rushville, Ind., will install in its electric light plant a new 160-kw. engine, switchboard and other equipment. Address City Clerk.

The Covington Water & Light Company, Covington, Ind., will rebuild the plant recently destroyed by fire. E. H. Nebeker is president of the company.

The J. W. Beck Light, Heat & Power Company has been incorporated at Carthage, Ind., to supply heat, light and power. The capital stock is $10,000. The directors are John W. Beck, Jesse C. Overman and D. S. Beck.

The Haney Gas Engine Company, Ligonier, Ind., has been incorporated by F. H. Green, A. W. Lyon and A. O. Haney. The company will occupy a new factory, 50 x 125 ft., two stories high, and will manufacture a gas engine made and perfected by A. O. Haney.

The Frankfort Heating Company has been incorporated at Frankfort, Ind., with $100,000 capital stock to build and operate a heating plant. The directors are John A. Ross, George W. Neal and Robert P. Shanklin.

The Wabash Artificial Ice & Cold Storage Company has been incorporated at Wabash, Ind., and will build a plant. The directors are Abraham Strickler, Horatio S. Logan and Lawrence Simpson.

The Croninger Packing Company, Shamokin, Pa., has completed plans for a packing house, cold storage and ice manufacturing plant, 64x140 ft. The ice machines are now ready for installation and later an additional boiler, electric generator, motors, etc., will be put in.

The William Tod Company, engineer, founder and machinist, Youngstown, Ohio, has recently received orders for two pairs of steam blowing engines for the new plant of the Indiana Steel Company, Gary, Ind. The engines are to be of the horizontal cross compound type with steam cylinders 44 in.

and 84 in. in diameter, and air cylinders 90 in. and 90 in. in diameter, all having a stroke of 72 in. Each pair of these engines has a capacity of 50,000 cu. ft. of free air per minute compressed to a normal pressure of 18 lb. The company has also made a contract with the Akron Water Works Company, Akron, Ohio, for a 15,000,000-gal. vertical triple expansion pumping engine. The engine will be of the latest design, similar to engines furnished cities of Springfield, Ohio; Canton, Ohio; Kansas City, Mo.; and the Queens County Water Company, New York.

Specifications are being prepared for the municipal power plant to be erected by the city of Orange, N. J., and very shortly the city will call for bids. There will be about 450 kw. of engines divided in three units of 150 kw. each, with corresponding boilers. The city will purchase at first 350 arc lights, and the system will be divided into seven circuits with 50 lights to a circuit. James M. Seymour, 51 Lawrence Street, Newark, N. J., is consulting engineer on the work, and he can give details regarding the specifications.

The Power Specialty Company, Trinity Building, New York, with works at Dansville, N. Y., announced that the demand for its Foster superheaters has increased so rapidly, and the results following the establishment of its branch offices in Chicago and Boston have been so satisfactory, that it decided to open a branch office in the Land Title Building, Philadelphia. This was done on October 1, and the new office is in charge of W. E. Dowd, Jr.

James McClain, of the Driggs-Seabury Ordinance Corporation, Sharon, Pa., is at the head of a movement to establish a new plant for the manufacture of gas and gasoline engines at North Sharon. Work on the plant will be started within the next two or three weeks, and it is the intention to have it in operation within two or three months if possible.

Foundries.

The Le Valley Mfg. Company has been incorporated in Milwaukee, Wis., with a capital stock of $50,000, by C. W. Le Valley, Donald Frazer, W. C. Sargent and Wm. C. Frye. The company proposes to erect a steel foundry to cost from $7000 to $10,000 on a site between Muskego avenue and Park street and near the Sixteenth street viaduct.

The Machinists' Foundry Company has been incorporated at Muncie, Ind., with $10,000 capital stock, by Alvah L. Bingham, Fred. C. Kaiser and John M. Stetter.

Madden & Co. have incorporated at Rushville, Ind., to do an iron and brass foundry business. The capital stock is $25,000. Directors are James W. Arbuckle, Stephen Kelly and Wallace Morgan

The Fitchburg Foundry Company, Fitchburg, Mass., is contemplating a large addition to its foundry, but nothing definite has been decided upon.

The Bell & Fyfe Foundry Company, Brooklyn, N. Y., has moved to its new office and foundry at Halsey street and the East River, Astoria, L. I. The plant has been equipped with up-to-date machinery and the company is in a position to handle castings of any weight up to 50 tons and can guarantee prompt delivery.

It is stated that the recently organized Standard Cast Iron Pipe & Foundry Company, Philadelphia, Pa., has purchased 130 acres of land just north of Bristol, Pa., upon which it will erect a large group of buildings, plans for which are now being prepared.

The Pittsburgh Malleable Iron Company has commenced the construction of its new works at Elwood City, Pa., and will rush the erection as rapidly as possible. It will be one of the largest plants in Lawrence County.

Work on the new wheel foundry of the Standard Steel Car Company, at Butler, Pa., has been progressing so rapidly that the company expects to have it in operation within a month. The building will be 200 x 350 ft., and will contain three cupolas. The car wheels will be cast by the continuous method, and the equipment will be the most modern in use in this country. The plant will have a capacity of 500 car wheels daily. The company is also erecting a bolt and rivet department, 160 x 200 ft., which will be ready for operation about December 1, and will have a capacity of 50 tons of bolts and rivets a day.

The East Liverpool Foundry, Machine & Supply Company, East Liverpool, O., has awarded a contract to local builders for the construction of a new foundry, one story, to cover 3,600 sq. ft., and a machine shop, two stories, to cover 3,000 sq. ft. The construction will not interfere in any way with the operation of the present foundry. All the machinery needed has been contracted for. This company last April bought the foundry of Ormes Bros., and incorporated, with a capital stock of $20,000. Those most prominent in it are John C. Anderson, George A. Anderson and Frank E. Grosshans.

The Variety Iron & Steel Works Company, which is the successor of the Variety Iron Works Company, Cleveland, with a paid-up capital of $400,000, has elected the following officers: J. H. Webster, president and treasurer; L. D. Weaning, vice-president; F. A. Brodhead, Jr., secretary, and E. S. Cook and Paul North, additional directors.

Bridges and Buildings.

Joseph P. Rusche, Grand Rapids, Mich., has been awarded a contract by the Grand Trunk Railroad Company for the construction of four large bridges.

The Central States Bridge Company, Indianapolis, Ind., has secured the structural iron work from the general contractor who is to build the new machine shops of the Big Four Railroad at Beech Grove, near Indianapolis, Ind. About 3500 tons of steel will be required.

Fires.

The shops of the Western & Atlantic Railroad at Atlanta, Ga., were destroyed by fire last week, the loss being estimated at $100.000.

The electric light plant at Holton, Kan., was burned October 2. The loss is placed at $10,000.

The large plant of the Chicago House Wrecking Company, Chicago, Ill., was damaged $50,000 by fire October 6.

The main machine shop of the Canon City & Cripple Creek Railroad at Canon City, Colo., was burned last week and a great deal of the machinery equipment was destroyed. The loss is placed at $40,000.

The machine shop and roundhouse of the Gila Valley, Globe & Northern Railroad at Globe, Ariz., were destroyed by fire October 7. The loss is placed at $100,000.

Hardware.

The Union Vault & Safe Company has been organized in Rhode Island to deal in vaults and safes and to do vault construction for banks and prisons. The officers are: President, Edwin A. Smith; vice-president, Clarence S. Angell; treasurer, Eugene P. Lynch; secretary and general manager, William H. Owen. The control of the new company is in the hands of the Union Hardware & Electric Supply Company, Providence, but its organization is entirely separate. The company will conduct a store at 108 Sudbury street, Boston, as well as at 49 Exchange place, Providence. It is the sole New England agent for the Diebold safes.

The business of the Boston Bolt Company, Farnsworth street, Boston, has been incorporated in Massachusetts with a capital stock of $100,000 and the following officers: President and treasurer, John W. Crooks; clerk, J. Edward Beard; directors, these officers and F. E. Todd and F. A. Gardner. The purpose of the corporation is to provide the new capital necessary in the recent enlarging of the company's business and the establishment of the new plant which it now occupies.

The Strubler Computing Scale Company has been incorporated at Elkhart, Ind., to manufacture a computing scale. The directors are Chas. G. Strubler, Chas. B. Broderick, Jr., Harry Miller and John A. Moran.

Anchor Fence Mfg. Company, Omaha, Neb., manufacturer of fences, gates, window guards, elevator inclosures, stable fittings, wire screens, &c., has doubled its capacity for Anchor fence.

The Sanitary Steel Couch Company has been incorporated at Elkhart, Ind., with $100,000 capital stock, to manufacture folding couches. The directors are Nathan S. Smyser, Chas. A. Sidway and Wm. J. Grotenhaus.

The Wragg Patent Decorative Plaster Wall & Ceiling Company, 141 Grosvenor street, Hartford, Conn., has been organized with $100,000 authorized capital stock, of which $50,000 will be issued at this time. The incorporators are Isaac R. Sanford, M. W. Wragg and M. E. Wragg. The company will manufacture walls and ceilings under the Wragg patents, using blocks instead of lath and mortar.

The Boston branch of the Moneyweight Scales Company, distributing agent for the Computing Scales Company, Dayton, Ohio, has outgrown its present quarters at 109-111 Summer street and has leased a building at Franklin and Congress streets. The company states that late improvements on the computing scales has warranted an advance in price of from 25 to 40 per cent., which became effective October 1.

The Russell & Erwin Mfg. Company, New Britain, Conn., is to materially increase the capacity of its works by raising several of its buildings. Buildings Nos. 21, 22 and 23 will be raised two stories, and building No. 24 one story. The japan room will be removed from building No. 22 to a new japannery now in process of construction. The company is not at present in the market for any equipment, excepting an elevator of the electric type.

The Enterprise Mfg. Company, Akron, Ohio, is building a large four-story addition to its factory, to take care of its increased business in fishing tackle, reels, hooks, baits, flies, &c. Last year its capacity was taxed to the utmost to get out orders promptly.

In February last the Anderson Forge & Machine Company, Detroit, Mich., was organized and purchased from W. H. Anderson & Sons Company of the same city that portion of its business relating to general forgings, automobile crank shafts, cold chisels and plumbers' caulking tools. Subsequently a complete drop forging equipment was installed. Orders for drop forgings have been booked from some of the largest automobile and machine manufacturers, and the equipment is being run to its

utmost capacity. The company is now erecting an additional building 35 x 115 ft., two stories, heavy mill construction, in which to install its department for manufacturing crank shafts and drop forged ties.

The Skinner Chuck Company, New Britain, Conn., is building an addition to its plant, and is increasing its equipment of machines and tools as rapidly as possible.

The Massachusetts Saw Works, Chicopee, Mass., has bought out the saw department of the Springfield Machine Screw Company of the same city. The lines included in this department are kitchen saws, butcher saw blades, hack saw blades and frames and cup point nail sets.

The plant of the Case Brothers' Cutlery Company is to be removed from Little Valley, N. Y., to Kane, Pa., where the company will have an enlarged plant and greatly improved manufacturing facilities, including the use of natural gas as fuel. The capital stock of the company has been increased to $100,000.

The Wood Shovel & Tool Company, Piqua, Ohio, reports that an addition to its plant is under construction, which it hopes to occupy the latter part of October.

The Samson Cordage Works, 88 Broad street, Boston, Mass., manufacturer of solid braided cords, and cotton twines, has recently nearly doubled the size of its plant.

The Pittsburgh Shovel Company, Leechburg, Pa., has installed a complete line of machinery for the manufacture of handles and wood specialties.

Miscellaneous.

The Witte Iron Works, Kansas City, Mo., was awarded a contract on the 20th ultimo for furnishing the equipment for the new water works system of Neosho, Mo.

The Wolf Lake Portland Cement Company has been incorporated at Wolf Lake, Ind., with $50,000 capital stock to manufacture Portland cement. The directors are Chas. F. Knowlton, James F. Patterson and John E. Potter.

The South Bend Plating Works has been incorporated with $5000 capital stock, to make articles of metal. The directors are Harry P. Parker, Geo. H. Comstock and Griffith E. Barnett.

The Albany Automobile Company has been incorporated at Albany, Ind., with a capital stock of $10,000, to manufacture automobiles, by Jas. B. McNary, John L. Tulley and Wm. L. Cory.

The Model Automobile Company has incorporated at Peru, Ind., with $50,000 capital stock, to manufacture automobiles. Milton Krauss and W. S. Mercer are two of the directors.

The Postal Auto & Engine Company has been incorporated at Bedford, Ind., with $20,000 capital stock. The directors are Sherman L. Keach, Chas. A. Walker, Newton M. Anderson, George P. Parks and Jesse O. Greenland.

The Universal Lock Socket Company, Chicago, has been organized for the purpose of manufacturing a patent electric light socket with a locking device to prevent the removal of the lamp. This device was designed primarily for electric lights exposed in public places and is to prevent them from being stolen. The incorporators are Clayton R. Taylor, Wm. M. Klein and Ota P. Lightfoot.

A stone quarry plant, to cost $100,000, will be built at Bloomington, Ind., by a company of which C. L. Reed, Albert Kleybolte and A. J. Stanton of Cincinnati, Ohio, and Dr. Peyton of Jeffersonville, Ind., are the principal stockholders.

The Jones Self-Measuring Pump Company has been incorporated at Marion, Ind., by Isaac L. Ayres, Harley O. Faulkner, Chas. S. Jones, Bernard Shively and Wm. M. Amsden. The company will manufacture pumps, tanks and self-measuring devices.

The American Water-Fuel Company, Rochester, N. Y., recently incorporated with a capital stock of $200,000, will manufacture a device for burning water and oil in stoves. For the present the apparatus will be made at different points throughout the country, but later on the company will very likely establish a plant in Rochester. Offices will probably be opened in Chicago and San Francisco. William G. Hull is president; I. J. Fisher, vice-president; Charles D. Leonard, secretary; J. P. MacSweeney, assistant secretary, and Frank W. Zoller, treasurer.

The Star Corundum Wheel Company, Limited, Detroit, Mich., has awarded contract for a new building, 70 x 175 ft., of reinforced concrete construction, which will be located on Calvary avenue, on the Wabash Railroad. The building will be fireproof throughout. Power will be furnished by three-phase electric motors, and the plant will be equipped with modern machinery for the manufacture of abrasive wheels. The output will consist principally of solid corundum wheels, the vitrified, silicate and elastic processes being employed.

The Woodhouse Chain Works, Trenton, N. J., has recently booked an order for 150 fathoms of 1¼ inch chain for the Lighthouse tender Sunflower, for the United States Government.

D. McDonald & Co., Albany, N. Y., manufacturers of gas meters, are building a new plant of reinforced concrete, the main building of which will be four stories high, 150 x 200 ft., with a court in the center, 50 x 100 ft. The court will be roofed over at the second floor level giving an area on the first floor of 30,000 sq. ft. On the south side of the building will be a one-story wing to be occupied by the blacksmith shop, power house and cold storage.

Changes in Cast Iron Car Wheels.

The Master Car Builders' Association has adopted by letter ballot the two recommendations of its Committee on Cast Iron Wheels, which increase the thickness of the flange ⅛ in. and change the taper of the tread from 1 in 25 to 1 in 20. As indicated in an article in *The Iron Age* of September 6, 1906, page 614, the expectation is that these changes will increase measurably the strength of the flange, the addition of ⅛ in. of metal to the back adding to the effective area of resistance by about 15 per cent. It is stated that in a perfect wheel the shearing strength would increase by more than 30 per cent., assuming uniform strength throughout the section. In recommending the change in the taper of the tread the committee says that experiments recently made indicated less flange wear and a longer life to the wheel by reason of this change in the coning of the tread.

In the discussion of the Master Car Builders' committee's report at the meeting of the association in June it was stated that it has been the opinion of the majority of wheel makers that a large body of soft iron behind the flange would give a stronger wheel. Commenting on this the *Railroad Gazette* says:

Whether there is any truth in this assumption we are not prepared to say. Chilled cast iron is brittle and should, therefore, be easily broken, but trying to break a cast iron wheel by pounding on the tread with a sledge hammer gives evidence that there is strength and adhesiveness at that point. Good chilled cast iron is not weak. Few tensile tests of this material have been made owing to the difficulty and expense of preparing the specimens, but in one case where the specimens were carefully taken from the chilled portion of a 33-in. standard wheel a tensile strength of 36,000 lb. per square inch was obtained. There was no elongation of the material, and careful observation failed to detect the limit of elasticity. It would be a fine grade of soft cast iron that would sustain such a load before fracture. Inasmuch as the chilled face of the flange is in tension under the side stresses set up on curves, and as these stresses are not commonly in the nature of a true impact but are suddenly applied and long sustained static stresses, it would seem, in the light of the tests made, that in a sound and perfect wheel of the existing contour sufficient metal of high tensile strength is already provided at the weak point. Because chilled cast iron is hard and brittle it should not be carelessly concluded that it is any weaker to resist the stresses imposed on it than the soft gray iron back of it which is poured from the same ladle.

The advantage gained by increasing the thickness of the flange on the outside ⅛ in. arises from another cause then inherent structural weakness of the chilled and gray iron. Flange breakages are most common on mountain roads having long grades and sharp curves. It has been satisfactorily proved that the heating of the tread and flange of the wheels by rubbing against the rails and by long continued brake applications produces longitudinal seams in the throat of the flange. These seams have the same effect as nicking in a bending test piece; once developed on the surface they go deeper into the chilled metal of high tensile strength and on the first severe stress the flange breaks off. The actual gain, however, will probably be much less. The increased thickness will not prevent the formation of longitudinal seams; it can only prolong the time the wheel will run without breaking after the seams appear. Service alone can determine how much it will prolong it.

The United States armored cruiser North Carolina was successfully launched October 6 at the yards of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va.

The Iron and Metal Trades

Returns to *The Iron Age* from the Coke and Anthracite blast furnaces show that Pig Iron production in the 30 days of September was 1,970,962 gross tons, as compared with 1,926,736 tons in August, with 31 days. The daily rate was 65,699 tons in September, an increase of 3546 tons a day over the average in August. September has thus substantially checked the decline in production which has been noticed month by month since March. The weekly capacity of 311 furnaces active October 1 was 469,665 tons; on September 1 it was 441,426 tons. A monthly increase of 120,000 tons is thus indicated.

The purchases of Basic Pig for the Pencoyd Works amounted to 61,500 tons for delivery during the first half of 1907 and about 7000 tons for prompt delivery. One large steel plant in eastern Pennsylvania has taken 10,000 tons for this year and 25,000 tons for 1907. One tidewater plant purchased 10,000 tons and another 4000 tons for 1907 and a third plant 5000 tons for this year. Altogether these and some minor sales foot up close to 125,000 tons, with further inquiries in the market. It may be noted that at the same time eastern Pennsylvania Steel makers purchased between 25,000 and 30,000 tons of Heavy Melting Scrap at $18 to $18.50.

Some good sales of Foundry Iron are reported in this section, and quite a good deal of Forge Iron has also been marketed. The Southern Iron makers do not seem to be pushing sales in any direction.

Importers have been studying the chances of placing Middlesbrough and Scotch Irons, and some moderate business has been done. Middlesbrough No. 3 is being offered at $19.50 ex ship, duty paid, but consumers are slow to take hold, many being adverse to changing their mixtures. It is understood that quite a tonnage of Pig Iron Warrants has been bought for American account, but it is yet an open question whether the buyers will take the profit available from the rise, or will ultimately decide to ship the Iron.

Only moderate transactions in Steel Rails are reported, but it is probable that some important negotiations now pending will be closed at an early date.

There has been quite a good run of contracts for Structural Material, chiefly for shops and buildings. In Bridge Material the most important transaction now being closed is for 19,000 tons for the Canadian Pacific Railroad.

The Plate makers are booking a good deal of business and specifications are rolling in freely. There is an inquiry in the market for 5000 tons of Sheared Plates for Buffalo, and for a very large tonnage for a California irrigation project.

In the Merchant Pipe trade, makers are figuring on some good orders for Line Pipe.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Oct.10, 1906.	Oct.3, 1906.	Sept.12, 1906.	Oct.11, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$21.00**	$21.00	$20.50	$17.25
Foundry No. 2, Southern, Cincinnati	**20.00**	19.50	18.75	15.25
Foundry No. 2, Local, Chicago	**20.50**	20.50	19.75	17.25
Bessemer, Pittsburgh	**20.35**	19.85	19.60	16.35
Gray Forge, Pittsburgh	**19.35**	18.35	18.35	15.60
Lake Superior Charcoal, Chicago	**21.00**	21.00	20.00	18.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	25.00
Forging Billets, Pittsburgh	34.00	34.00	34.00	29.00
Open Hearth Billets, Phila	**32.50**	32.00	30.50	28.00
Wire Rods, Pittsburgh	**34.50**	34.00	34.00	31.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago	**17.00**	17.00	16.50	14.50
O. Steel Rails, Philadelphia	**18.50**	18.50	18.00	16.50
O. Iron Rails, Chicago	**25.50**	25.50	23.50	22.00
O. Iron Rails, Philadelphia	**25.00**	25.00	24.00	22.50
O. Car Wheels, Chicago	*19.00*	19.00	20.00	16.00
O Car Wheels, Philadelphia	**20.75**	20.75	17.50	16 00
Heavy Steel Scrap, Pittsburgh	**17.50**	17.50	16.75	16.50
Heavy Steel Scrap, Chicago	16.50	16.50	16.50	14.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	**1.83½**	1.83½	1.73½	1.73½
Common Iron Bars, Chicago	1.71½	1.71½	1 71½	1.75
Common Iron Bars, Pittsburgh	1.60	1.60	1.60	1.74¾
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.89½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.89½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.57½	1.57½	1.57½	1.50
Skelp, Sheared Steel, Pittsburgh	1.60	1.60	1.60	1.55
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2 40	2.15
Wire Nails, Pittsburgh	1.85	1.85	1 85	1.80
Cut Nails, Pittsburgh	**1.90**	1.90	1.75	1.65
Barb Wire, Galv., Pittsburgh	2.30	2.30	2.30	2.25
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents
Lake Copper, New York	**22.00**	21.00	19.12½	16 62½
Spelter, St. Louis	**6.05**	6.15	5.95	5 85
Lead, New York	5.90	6.00	5.90	4.95
Lead, St. Louis	**5.85**	5.80	5 80	4.92½
Tin, New York	**42.50**	42.45	40.30	32.20
Antimony, Hallett, New York	**24.50**	24.00	24.00	12.25
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York	$3.94	$3.94	$3.94	$3.49

Chicago.

FISHER BUILDING, October 10, 1906.—(*By Telegraph.*)

Although the market in both raw and finished lines is in a state of comparative inactivity so far as new business is concerned, there has been no decline in consumption and the pressure on the mills for the shipment of material is growing from day to day. Increased output secured from mills and furnaces thus far this month will relieve the situation to some extent, but the car shortage, which is becoming more pronounced, promises to complicate matters and still further delay deliveries. The railroads throughout the West and Northwest not only are unable to furnish sufficient cars to meet the requirements of manufacturers, but cannot place sufficient rolling stock at the disposal of the Steel mills for the shipment of their Rails and Track Material. Within the past few weeks a number of roads have lost their rollings on this account, as the Illinois Steel Company refuses to stock Rails awaiting the receipt of cars. The movement of prices continues upward, and sales of Steel Bars at an advance of $2 for early shipment are now being freely made. Light Rails have been again advanced $2 a ton, and despite the increased cost and time of delivery, which is deferred nearly five months, new business is reported heavy. In Structural Shapes the most notable order calls for 3300 tons for the Big Four shops at Indianapolis, and the projected $7,000,000 Northwestern Railway station and the street railroad tunnels through downtown streets will require a large tonnage of Steel, which has not yet been estimated. Sales of Malleable Bessemer Pig Iron aggregating 10,000 tons have been made for first half delivery at unchanged prices, although other grades of spot Foundry Iron have again been advanced from 25c. to 50c. a ton.

Pig Iron.—Southern operators continue to advance prices, notwithstanding the comparatively limited movement of their product in this market. For delivery through the first half quotations have been marked up to a minimum of $16.25, Birmingham, for No. 2, while spot Iron has sold at $18 during the week. Sales of Malleable Bessemer made by Northern furnaces aggregate 10,000 tons at $20.50, Chicago, for first quarter and first half shipment, while spot Iron nets $1 more a ton. Ohio and Kentucky Silvery Irons have again been advanced and grades containing 9 per cent. of silicon have been sold at $27.30, Chicago. Future buying of both Northern and Southern, with the exception of Malleable Bessemer, has been limited to 500 and 1000 ton lots, and the total for the week has not been heavy. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal	$21.00 to $21.50
Northern Coke Foundry, No. 1	21.00 to 21.50
Northern Coke Foundry, No. 2	20.50 to 21.00
Northern Coke Foundry, No. 3	20.00 to 20.50
Northern Scotch, No. 1	21.00 to 21.50
Ohio Strong Softeners, No. 1	21.30 to 21.80
Ohio Strong Softeners, No. 2	20.80 to 21.30
Southern Coke, No. 1	20.40 to 20 90
Southern Coke, No. 2	19.90 to 20.40
Southern Coke, No. 3	19.40 to 19.90
Southern Coke, No. 4	18.90 to 19 40
Southern Coke, No. 1 Soft	20.40 to 20.90
Southern Coke, No. 2 Soft	19 90 to 20.40
Southern Gray Forge	17.40 to 17 90
Southern Mottled	17.15 to 17.65
Malleable Bessemer	21.00 to 21.50
Standard Bessemer	20.80 to 21.30
Jackson Co. and Kentucky Silvery, 6 %	23.30 to 23.80
Jackson Co. and Kentucky Silvery, 8 %	25 30 to 25.80
Jackson Co. and Kentucky Silvery, 10 %	27.30 to 27.80

Billets and Rods.—Inquiries for large tonnages of Billets which developed in this market during the closing week of September have been withdrawn, owing to the inability of Steel makers to meet the required deliveries. The Allis-Chalmers Company is now in the market for 1000 tons of Forging Billets for first quarter shipment, and the indications are that the order will be taken by a Western mill. We note the sale of a small lot of high carbon special Forging Billets at $42, although the base on current tonnage ranges from $36 to $37. The production of Rods has been slightly increased this month, but deliveries are still greatly deferred.

Rails and Track Materials.—Light Rails have been advanced $2 a ton by the Illinois Steel Company, and there has been no diminution of new business, despite the higher prices which are prevailing. Shipments cannot be made in less than five months, and the buying is limited to first quarter requirements. The Chicago & Southern Indiana Railroad has purchased 6000 tons of Standard Section Rails from the Cambria Steel Company for 1907 delivery, this being the only order of note closed during the week. The buying of Track Material for next year continues unabated, the Ilinois Steel Company already being unable to promise deliveries before next July. Quotations are as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.27½c. to 2.50c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, $30 to $31; 25-lb., $32; 20-lb., $32; 16-lb., 34; 12-lb., $35, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—While the increased producing capacity which has come in during the year has relieved the pressure on the mills, there is no dearth of new business and all are engaged at their capacity. New contracts include: Big Four shops, Indianapolis, 3300 tons, placed with the Central States Bridge Company; Joplin Hotel, Joplin, Mo., 800 tons, and for cement plants, Independence, Mo., and Hager, Kan., 6000 tons, Des Moines Bridge & Iron Works, Des Moines, Iowa; La Salle Street tunnel, Chicago, 400 tons; Western Smelting Company, 250 tons, and Western Realty Building, San Francisco, 325 tons, taken by the American Bridge Company. The Chicago Union Traction and the Chicago City Railway companies have agreed to do away with downtown surface lines, and a stipulation for a proposed underground system, costing $5,000,000, has been made in a new traction ordinance, which will go to the Local Transportation Committee Thursday of this week. Announcement is made that the Chicago & Northwestern Railway plans a huge station costing $7,000,000, and rumors are also current that the Pennsylvania Railroad will follow suit by the erection of a large passenger depot in Chicago. All of these propositions, if carried to a successful issue, will involve large tonnages of Shapes. Material from store is moving in fair volume, and is held at 2.05c. to 2.10c. Mill quotations are unchanged as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—Heavy specifications continue to be secured from lake shipyards and Western car builders, and deliveries cannot be made from local mills in less than 60 days. Prices are as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c., base, for ¼ in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in., up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8, up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—On some of the lighter gauges of Black Sheets local distributers have advanced store prices $1 a ton. The mills almost without exception have sufficient tonnage on their books to carry them through the year and shipments are delayed from 30 to 60 days. Quotations are unchanged, as follows: Blue Annealed, No. 10, 1.91½c.; No. 12, 1.96½c.; No. 14, 2.01½c.; No. 16, 2.11½c.; Box Annealed, Nos. 17 to 21, 2.41½c.; Nos. 22 to 24, 2.46½c.; Nos. 25 and 26, 2.51½c.; No. 27, 2.56½c.; No. 28, 2.66½c.; No. 29, 2.81½c.; No. 30, 2.91½c. Galvanized Sheets, Nos. 10 to 14, 2.61½c.; Nos. 15 and 16, 2.81½c.; Nos. 17 to 21, 2.96½c.; Nos. 22 to 24, 3.11½c.; Nos. 25 and 26, 3.31½c.; No. 27, 3.51½c.; No. 28, 3.71½c.; No. 30, 4.21½c. Sheets from store: Blue Annealed, No. 12, 2.15c. to 2.25c.; No. 14, 2.20c. to 2.30c.; No. 16, 2.30c. to 2.40c.; Box Annealed, Nos. 18 to 20, 2.60c. to 2.70c.; Nos. 22 to 24, 2.65c. to 2.75c.; No. 26, 2.70c. to 2.80c.; No. 28, 2.85c. to 2.95c.; No. 30, 3.25c. to 3.35c. Galvanized from store: Nos. 10 to 20, 3.10c. to 3.20c.; Nos. 22 to 24, 3.35c. to 3.45c.; No. 26, 3.45c. to 3.55c.; No. 27, 3.55c. to 3.75c.; No. 28, 3.85c. to 3.95c.; No. 30, 4.45c. to 4.55c.

Bars.—Sales of Steel Bars for early delivery are being made on the basis of 1.60c., Pittsburgh, consumers being willing to pay the $2 advance to secure material as required. All of the mills of the United States Steel Corporation continue to maintain a basis of 1.50c., although nearby deliveries cannot be made. Local jobbers expect shortly to advance material from stock $2 a ton, as the demand is exceedingly heavy. Iron Bars are unchanged, at 1.55c. to 1.60c., Pittsburgh, although desirable orders can be placed at 1.50c. We quote as follows: Iron Bars, 1.71½c.; Steel Bars, 1.66½c. to 1.76½c., both half extras; Hoops, 2.06½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c.; Steel Bars, 1.85c., and as high as 2c. is asked on certain scarce sizes; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.30c. to 2.40c., full extras.

Merchant Pipe.—Conditions in the Merchant Pipe trade are practically without change. Distributers are buying freely for nearby requirements, but are not interested in covering for future needs despite the low prices which are prevailing. The basis of 81 and 5 off the list, Pittsburgh, is strictly maintained, and the equivalent discounts, Chicago, car lots, are as follows: Black Steel Pipe, 79.35 per cent. on the base sizes, ¾ to 6 in., and Galvanized, 69.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 in.

Boiler Tubes.—The movement from local stocks is reported very satisfactory, and prices are being well maintained. Mill specifications on existing contracts are large, railroad needs being notably heavy. Mill quotations are unchanged as follows, on base sizes 2¾ to 5 in., in carload lots: Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2½-in. and smaller and lengths over 18 ft., and 2½-in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1¼ in	40	35	42½
1⅜ to 2¼ in	50	35	35
2½ in	52½	35	30
2¾ to 5 in	60	47½	42½
6 in. and larger	50	35	..

Merchant Steel.—Buying is light, as practically all the large consumers covered their requirements during the summer months. Specifications, however, are taxing mill capacity, the demands of the implement makers being almost insatiable. Shafting quotations are well maintained, makers generally having large tonnages on their books. We quote. Planished or Smooth Finished Tire Steel, 1.86½c.; Iron Finish, up to 1½ x ½ in., 1.81½c.; Iron Finish, 1½ x ½ in. and larger, 1.66½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.16½c., and 1⅛-in. and larger, 2.06½c.; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.96½c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—Current demand notwithstanding the season continues heavy, Western railroads buying freely to make water extensions. The tonnage now on the books of all the large foundries will carry them well through the year and no opportunity will be afforded them of making up stocks before January 1. We make the following quotations: Water Pipe, 4-in., $34; 6, 8, 10 and 12 in., $33; over 12-in., $32, with $1 extra for Gas Pipe.

Coke.—Delayed deliveries of Foundry Coke from the Connellsville and Virginia fields has developed a spot market, and material on track is selling at $6.40, Chicago. There is little buying, however, for future delivery, as practically all the Western consumers are covered to January 1. We quote 72-hour Connellsville Coke at $6.15 to $6.40, Chicago; Virginia, $5.75 to $6, and by-product, $6.15 to $6.25.

Old Material.—Offerings of railroads for the week will aggregate quite a large tonnage, being in the neighborhood of 6000 tons. The Rock Island and the Chicago & Eastern Illinois closed small lists on Monday, and the Baltimore & Ohio had out a list of 4500 tons, mentioned last week, for closing on Tuesday. The Santa Fé also had a list for disposition on Tuesday, approximating 1200 tons. Dealers have been regularly absorbing all railroad offerings, and the lists to be closed this week will doubtless readily be taken. Active buying continues, but no unusually notable sales are reported for the week. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails	$25.50 to $26.00
Old Steel Rails, 4 ft. and over	18.00 to 18.50
Old Steel Rails, less than 4 ft.	17.00 to 17.50
Heavy Relaying Rails, subject to inspection, 50 lb. and under	28.50 to 29.00
Old Car Wheels	19.00 to 19.50
Heavy Melting Steel Scrap	16.50 to 17.00
Frogs, Switches and Guards	17.00 to 17.25
Mixed Steel	14.00 to 14.50

The following quotations are per net ton:

Iron Fish Plates	$20.00 to $20.50
Iron Car Axles	25.00 to 25.50
Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	17.50 to 18.00
No. 2 Railroad Wrought	16.50 to 17.00
Railway Springs	15.50 to 16.00
Locomotive Tires, smooth	16.00 to 16.50
No. 1 Dealers' Forge	13.50 to 14.00
Mixed Busheling	11.50 to 12.00
Iron Axle Turnings	10.50 to 11.00
Soft Steel Axle Turnings	10.50 to 11.00
Machine Shop Turnings	10.50 to 11.00
Cast Borings	8.50 to 9.00
Mixed Borings, &c.	8.50 to 9.00
No. 1 Mill	10.00 to 10.50
No. 2 Mill	9.00 to 9.50
No. 1 Boilers, cut to Sheets and Rings	11.50 to 12.00
No. 1 Cast Scrap	15.50 to 16.00
Stove Plate and Light Cast Scrap	12.50 to 13.00
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.50 to 15.00

Metals.—Metals are stronger throughout the list, and on Tin, Copper, Lead and Antimony advances over last week have been made. Lake Copper is practically unobtainable at any price but is quoted on the same basis as Casting Copper. Speculative influences have forced up the prices of Tin, and Lead also has taken an upward jump of 7½c. per 100 lb. Sheet Zinc is strong at 7.75c. and an advance is shortly anticipated. We quote: Casting Copper, 23c. to 23¼c.; Lake, 23c. to 23¼c., in car lots; small lots ¼c. to ⅜c. higher; Pig Tin, carloads, 44⅞c.; small lots, 45½c. to 45¾c.; Spelter, prompt delivery, 6.50c. to 6.60c., for car lots; Lead, desilverized, 6.05c. to 6.15c., for 50-ton lots; Corroding, 6.75c. to 6.85c., for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Cookson's Antimony, 28½c., and other grades, 26½c. to 27½c.; Sheet Zinc is 7.75c. list, f.o.b. Lasalle, in car lots of 60-lb. casks. On Old Metals we quote: Copper Wire, 18c.; Heavy Copper, 17¾c.; Copper Bottoms, 17¼c.; Copper Clips, 17¼c.; Red Brass, 17¼c.; Red Brass Borings, 14¼c.; Yellow Brass, 12¾c.; Yellow Brass Borings, 11¼c.; Light Brass, 9¼c.; Lead Pipe, 5.40c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 26c.; Tin Foil, 32c.; Block Tin Pipe, 27½c.

Birmingham.

BIRMINGHAM, ALA., October 7, 1906.

Pig Iron.—The market conditions continue very much the same as last week. A certain amount of business is still being placed for delivery during the first half of next year, the average price for which is $15.50 on a No. 2 Foundry basis. None of the furnaces in the district have been forced to shut down this week, as had been feared, owing to the heavy rains which flooded the quarries and open mines, but all have been working badly and the production for the past 10 days has consisted almost entirely of lower grades, thus putting an additional premium on Nos. 1 and 2 Soft. All furnaces here are getting behind on deliveries of Soft Iron, and while everything possible is being done to improve the workings of the furnaces the desired results have so far been unobtainable. As high as $18 has been paid for No. 2 Soft this week for immediate shipment and producers are predicting that it will go to $20 before the end of the year. The price on Soft should have but little bearing on other grades of Foundry Iron, however, as on some of the furnace yards there is already an accumulation of off grades which should have a tendency to weaken rather than strengthen the price for this kind of Iron.

Cast Iron Pipe.—The Cast Iron Soil Pipe market is exceedingly active, with very small stocks in manufacturers' yards. On 4-in. Standard Pipe it is almost impossible to get prompt shipment, every plant in the district loading its make of this size directly from the foundry into cars. The demand for Water Pipe in small lots continues heavy, but on 4 and 6 in. few foundries will promise delivery prior to January. Prices on Water Pipe remain unchanged and are approximately as follows: 4 to 6 in., $30; 8 to 12 in., $29; over 12-in., $27.50, with $1 per ton extra for Gas Pipe. On large contracts these prices might be slightly shaded, but on small orders a little advance would probably be required.

Old Material.—The market is strong, with an upward tendency. Cast is getting scarce and dealers have advanced the price 50c. per ton. Steel is more active than for some weeks and several round lots of Wrought have been taken at prevailing prices. Dealers' quotations are about as follows per gross ton, f.o.b. cars here:

Old Iron Rails	$19.50 to $20.00
Old Iron Axles	18.50 to 19.00
Old Steel Axles	16.00 to 17.00
Old Car Wheels	16.50 to 17.50
No. 1 Railroad Wrought	16.50 to 17.00
No. 2 Railroad Wrought	14.50 to 15.00
No. 1 Country Wrought	14.50 to 15.00
No. 2 Country Wrought	11.50 to 12.00
Wrought Pipe and Flues	11.50 to 12.00
Railroad Malleable	13.00 to 13.50
No. 1 Steel	13.00 to 13.50
No. 1 Machinery Cast	14.00 to 14.50
Stove Plate and Light Cast	10.00 to 10.25
Cast Borings	7.00 to 7.50

Owing to the demand for its product the Southern Steel Company has been forced to put on an additional shift at its Wire mill at Ensley, and is now operating night and day. It is understood that its present equipment of Wire machines will be replaced by recently patented machines, which will not only largely increase the output but will enable it to produce Wire more cheaply than any of its competitors.

Philadelphia.

REAL ESTATE TRUST BUILDING, October 9, 1906.

Iron and Steel prices are steady, but there is a disposition to accept business without any advance on the previous week's prices, which is the first time in several weeks that this could have been said. It has been a steady rise for two or three months, and it is therefore quite natural that there should be a pause in the advance, even if it be only temporary, although it is more likely to be the culminating point in this movement. There are several reasons for this opinion, although some of them may not be immediately realized. One reason is that the furnace output is believed to be increasing. Another is because foreign Iron is beginning to come in, and will come in, increasing quantities if prices in our markets are maintained. Moreover, consumers have bought so heavily that there is little need for further purchases beyond a little once in a while to fill in with. The aggressive attitude of labor among the Welsh miners and among the workers on the Clyde and other British shipbuilding centers will also bear watching, as a gigantic strike is said to be extremely imminent. This would seriously disturb prices in Europe, and would probably result in holders of Pig Iron attempting to market some of their Iron in the United States. Prices here and abroad are so near to a parity that a little decline in foreign markets or a little advance here would make the proposition somewhat attractive. Considerations of this kind will have increasing force if any of these movements get well under way. Hence there is a natural desire to wait developments before extending engagements much further. The demand is very satisfactory, however, and makers have no difficulty in selling good sized lots at around to-day's prices whenever they feel inclined that way.

Pig Iron.—There is not as much pressure to buy Iron as there has been the past month or six weeks, although there is what may be called a good healthy market. The amount of Iron under contract, however, is so great that there is no necessity for extensive purchases in the immediate future; neither is there any necessity for additional sales beyond meeting the usual week to week business which is always more or less in evidence. This month should therefore be a period of readjustment in prices. As the trade perfectly well understands, recent quotations have covered a wide range, frequently $2 per ton on the same class of Iron, the variation being due on the one hand to the urgency for prompt deliveries and in the other case to the demand for long date shipments. This cannot continue for any length of time, so that it becomes a question of readjustment, but whether it will be a compromise between the high figures and the low figures of to-day, or a general marking up or a general marking down, remains to be seen. If the monthly furnace report shows a distinct tendency toward a larger out-

put, the recent quotations for prompt shipments will probably be considerably modified, and it may also affect the quotations for next year's deliveries, although not to the same extent. Prices for the present cannot decline much in any event. There is so much sold for delivery the remainder of the year that there is virtually nothing more to sell, and as regards next year's deliveries so much has been sold and so much bought that the probable effect would be a dull waiting market with little business and little change in prices unless production becomes unexpectedly heavy, in which case it would unquestionably result in lower prices. Conditions are as yet of the most encouraging character, but there are possibilities of occurrences which may make a material change as regards values. Hence at the present comparatively high level of prices a conservative attitude will no doubt be followed. Actual sales for October shipments have been made in small quantities at $23 to $23.50 for No. 2 X Foundry, and for the last quarter at $22.50 to $22.75. For the first half of 1907 a wide range of prices may be noted. Some new Irons are on the market at $21 for No. 2 X for deliveries the first half of 1907, while regular Irons are variously quoted at from $21.75 to $22.25. There is no uniformity whatever. What one seller might do is no rule for another, so that it is a matter of arrangement between buyer and seller and depends upon the circumstances in each particular case. A fair average at this writing would be about $22, but the feeling is very sensitive and prices are liable to move 25 to 50c. on very slight provocation. Low grade Irons are scarce and command the full figures of last week. Low Phosphorus is also firm with fairly large sales at within the range of $25.50 to $26 delivered consumers' yards nearby. Another cargo of 5000 tons of Foreign is afloat for the United States, and most of the demand is being supplied from this source in lots of 100 to 500 tons each at prices named. Basic Iron is firm and held at $19.50 with sales of small lots at that figure. There is some inquiry for this year's delivery, for which special prices are quoted, but for 1907 shipments the demand appears to be pretty well satisfied, and at the present quoted rates buyers are rather disposed to take their chances. The general range, however, for 1907 deliveries in this district would be about as follows:

No. 1 X Foundry	$22.00 to $23.00
No. 2 X Foundry	21.00 to 21.75
No. 2 Plain	20.00 to 21.00
Standard Gray Forge	18.25 to 18.50
Ordinary Gray Forge	17.75 to 18.00
Basic	19.25 to 19.50
Low Phosphorus	25.50 to 26.00
Malleable	21.00 to 21.50

Steel Alloys.—There has been quite a good business the past week or two, but the market is very uncertain. Good sized lots of 80 per cent. Ferro for next year's shipment have been secured at less than $74, but the asking price to-day is something better than $75. Sales for spot are said to have been made at about $82, while about $80 is named for November and December. Ferrosilicon, spot delivery, is quoted at $110, and 11 per cent. Ferro at $33, but the market is very irregular and prices are liable to wide variations.

Steel.—There are no indications of easier conditions in the Steel trade. Mills are full of orders and find it extremely difficult to make satisfactory deliveries, although they are making a large output. Prices are anywhere from $32.50 to $34 for ordinary Rolling Billets, and $36 to $40 for Forging Billets.

Plates.—Specifications are beginning to come in very rapidly, so that the mills are working to their full capacity as nearly as can be. New business has not been notably heavy, but there is plenty of work to go on with, so that a brief period of dullness makes little difference. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine	2.13½	2.18½
Locomotive Firebox Steel	2.23½	2.28½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 pounds.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—There is a somewhat heavy tonnage being placed, but the capacity for production is so large that it enables the mills to make good deliveries. Prices are unchanged at 1.83½c. to 2c., according to specification and tonnage required.

Bars.—Steel Bars are extremely active, and deliveries are a month to six weeks behind. Prices are nominally 1.73½c., but buyers pay a trifling advance to secure prompt shipments. Refined Iron Bars are somewhat handicapped by the price of Steel Bars, although 1.83½c. has to be paid for Best Refined Bar Iron. Considering that several local mills are out of commission temporarily, there is some disappointment that the demand is not more vigorous, although mills are pretty well employed.

Sheets.—The demand is quite active, and mills have plenty of business at about the following prices for mill shipments in carload lots, and a tenth additional for smaller quantities: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c. ;No. 27, 2.80c., and No. 28, 2.90c.

Old Material.—Following the remarks in last week's article it may be said that prices show a slight tendency toward a reaction. Except for Steel prices are nominally unchanged, but buyers have withdrawn or reduced their bids, so that to secure actual business concessions would have to be made. Steel is about 50c. per ton lower. Bids and offers for deliveries in buyers' yards are about as follows:

Steel Crops	$18.50 to $18.75
No. 1 Steel Scrap	18.00 to 18.50
Low Phosphorus Scrap	23.00 to 23.50
Old Steel Axles	25.00 to 26.00
Old Iron Axles	31.00 to 31.50
Old Iron Rails	25.00 to 26.00
Old Car Wheels	20.75 to 21.25
Choice Scrap, R. R. No. 1 Wrought	22.50 to 23.00
Choice No. 1 Yard Scrap	19.00 to 20.00
Long and Short	18.00 to 18.50
Machinery Scrap	18.25 to 18.75
Wrought Iron Pipe	16.25 to 16.75
No. 1 Forge Fire Scrap	15.50 to 16.50
No. 2 Light Ordinary	11.50 to 12.00
Wrought Turnings	14.25 to 14.75
Axle Turnings, Choice Heavy	15.75 to 16.00
Stove Plate	14.00 to 14.50
Cast Borings	11.50 to 12.00

G. K. Mohr has been admitted as a partner in the business conducted for many years by J. J. Mohr. The new firm will conduct business under the firm name of J. J. Mohr & Son, with offices in the Bullitt Building, Philadelphia.

Pittsburgh.

PARK BUILDING, October 10, 1906.—(*By Telegraph.*)

Pig Iron.—There is a good deal of inquiry for Bessemer, Basic and Foundry Iron, but the tonnage sold the past week has been small, due to the fact that the furnaces are sold up and it is difficult to find Iron for prompt shipment. A Mahoning Valley furnace has sold 6000 tons of Bessemer for delivery over the first half of next year at a price slightly under $19 at furnace, but there were some conditions attached to the sale which explain the comparatively low price. In the past two or three days there have been sales of 3000 to 4000 tons of Bessemer for this year's delivery on the basis of $19.25 to $19.50 at Valley furnace, but the market to-day is all of $19.50 at furnace, and we note a sale of about 2000 tons for this year's delivery at that price. Basic Iron is very firm at $19.25, Valley furnace, and some tonnage has been sold at that price, a Western consumer taking 3000 to 4000 tons for next year's delivery. The Westinghouse Machine Company has bought 2000 tons of No. 2 Foundry for next year's delivery. We quote Northern No. 2 Foundry for prompt delivery at $20.50 to $21, Valley furnace, and note especially that the same prices are being quoted for delivery in first quarter. Forge Iron has also advanced and we can report a sale of 1500 tons to a local consumer at $18.50, Valley furnace, or $19.35, Pittsburgh, with the market firm at that price.

Steel.—The shortage in Bessemer and Basic Iron is preventing the Steel plants from getting out their usual tonnage, and the scarcity of Bessemer and Open Hearth Steel is not being relieved to any extent. We continue to quote Bessemer Billets at about $28 and Open Hearth at $29 to $30, maker's mill. Sheet and Tin Bars for this year's delivery are held at about $30, Pittsburgh, to consumers that are not covered by contracts at slightly lower prices.

(*By Mail.*)

Indications are increasing that we are going to have a runaway market on Pig Iron, Steel and perhaps on one or two lines of Finished Material as well. Prices paid the last few days on Pig Iron show strongly that the market has gotten completely away from the furnaces, and where prices will stop is a question. Predictions are made that Bessemer and Basic Iron will go to $23 or $24 before January 1, and the course of the market in the last few days would indicate that this guess may not be far wrong. There have been actual sales in the past few days of Bessemer Iron for this year's delivery at $19.25 to $15.50, Valley furnace, while a sale of a fair tonnage of Bessemer Iron for delivery through the first six months of next year is reported on the basis of $20. Basic is bringing practically as high prices as Bessemer, and the supply is very scanty. Northern No. 2 Foundry is also scarce, and is selling at $20.50 to $21, at furnace. Forge Iron has likewise advanced sharply, and a sale of a round lot for this year's delivery has been made on the basis of $18.50, Valley furnace, or $19.35, Pittsburgh. There is an absolute scarcity in all kinds of Pig Iron. The higher prices on Iron are almost certain to bring still higher prices for Steel, which seems to be as scarce as ever and is bringing almost any price that sellers care to ask for reasonably prompt deliveries. Open Hearth Billets

have sold recently at $30 to $31, maker's mill, while Bessemer Billets are held firmly at $28, at mill. In Finished Iron and Steel an enormous tonnage is being booked, and specifications are crowding in to such an extent that the mills are getting further behind in deliveries than ever. The whole market, and this includes Raw and Finished Material, is as active as it possibly could be, with all signs pointing to this activity lasting for months.

Ferromanganese.—There is a fair amount of inquiry and prices are firm. We continue to quote 80 per cent. Ferro for prompt shipment at $80 to $83, while $75 to $77.50 is asked for delivery over the next three or four months.

Wire Rods.—In sympathy with Steel, prices on Wire Rods are very firm, and they are scarce for reasonably prompt delivery. We quote Bessemer Rods at $34.50 to $35 and Chain Rods from Bessemer stock at $33, Pittsburgh. Rods made from Open Hearth Steel are practically unobtainable and a sale of a small tonnage is reported at close to $36, Pittsburgh.

Muck Bar.—The high prices and scarcity of Forge Iron have brought about a sharp advance in prices of Muck Bar, and we now quote best grades of domestic Muck Bar made from all Pig Iron at $33.50 to $34, Pittsburgh. Muck Bar made from part Scrap is held at $30.50 to $31, Pittsburgh.

Skelp.—The demand for Skelp is rather quiet and prices have not responded to the advanced prices of Forge Iron and Muck Bar. We quote: Grooved Steel Skelp, 1.57½c. to 1.60c.; Sheared Steel Skelp, 1.60c. to 1.65c.; Grooved Iron Skelp, 1.65c. to 1.70c.; Sheared Iron Skelp, 1.75c. to 1.80c., Pittsburgh, these prices being for ordinary widths and gauges.

Steel Rails.—Of the Baltimore & Ohio order 37,100 tons were placed with the Carnegie Steel Company, which has also taken other orders for next year's delivery of 5000 tons or more. The demand for Light Rails continues heavy, the Carnegie Steel Company having booked over 20,000 tons in September, which is the largest tonnage in Light Rails it ever booked in any one month. The recent advance of $1 a ton is being firmly held and we quote Light Rails as follows: 20 to 45 lb. sections, $31; 16-lb. sections, $32, and 12-lb. sections, $33, at mill.

Structural Material.—Contracts taken during the week include one for 4000 tons for a local manufacturing concern, secured by the McClintic-Marshall Construction Company. A good many small contracts are being placed right along, the Pittsburgh Steel Construction Company having recently secured some very nice orders. This company is making a large addition to its Structural plant at Ambridge, Pa. Prices continue very firm, but as yet there are no signs that official prices will be advanced. We quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—Some very heavy contracts for Plates are in sight and will shortly be placed. The city of Buffalo, N. Y., is in the market for 5000 tons of Sheared Plates for an addition to its water system. The Michigan Central Railroad has placed a contract with the Great Lakes Engineering Works, Detroit, Mich., for a tunnel under the Detroit River, and this job will take about 5000 tons. Another inquiry that is in the market and is causing some comment is one for 150,000 tons of Sheared Plates, to be used in a water line for irrigating purposes in California. Several of the local mills have this inquiry, but whether anything will come of it is not known at this time. Mail orders for Plates continue heavy and it is stated that specifications from the Steel Car builders aggregate 2500 tons a day or more of Sheared Plates. Large orders are also pending for Plates to be used in the building of lake boats, and while the Plate mills are making good records in tonnage turned out they are getting further behind in deliveries. The Carnegie Steel Company is practically filled on both Sheared and Universal Plates into April of next year, and has been prorating orders for some time. None of the mills can make deliveries on either Universal or Sheared Plates inside of four weeks, and most mills are very much further behind. Prices are very firm and we quote: Tank Plates, ¼ in. thick, 6¼ in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—New business in Sheets continues heavy, and with the liberal specifications that are coming in on contracts the mills are congested with work and are getting further behind in deliveries. Stocks held by the mills and by jobbers are quite light. Indications point strongly to an advance in prices in the near future, but no intimation of this has yet come from the leading interest. Some of the independent Sheet mills that can make reasonably prompt deliveries are asking premiums of $1 to $2 a ton, and in many cases are getting them. We quote: Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.65c., and No. 30, 2.75c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.80c., and No. 30, 4.05c. We quote No. 28 Gauge Painted Roofing Sheets at $1.75 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.10 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—Both Iron and Steel Bars are in heavy demand, while specifications on contracts are coming in liberally, with the result that the mills seem to be getting further behind in deliveries. The Carnegie and Jones & Laughlin Steel companies are still quoting 1.50c. on Steel Bars for indefinite delivery, while the other mills are quoting 1.60c. It is not unlikely that some tonnage in Steel Bars will be diverted to the mills rolling Iron Bars, as the Steel mills seem to be getting further behind in deliveries. We quote Steel Bars at 1.50c. for indefinite delivery, and 1.60c., base, half extras, for delivery in three to four weeks. Iron Bars are held at 1.60c. minimum, with premiums of $1 to $2 a ton being paid for reasonably prompt shipment.

Hoops and Bands.—There has been a decided increase in new business in Hoops and Bands, the mills reporting that they have booked more orders the past week than for some time. Specifications on contracts are coming in very freely, and prices are firm, but unchanged. We quote: Steel Hoops, 1.90c. and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Tin Plate.—The tonnage in Tin Plate booked by the mills in September was fully as large or larger than in August, which was a record breaker. The mills have so much on their books for forward delivery that they refuse absolutely to sell for shipment beyond first quarter at present prices, but have taken some orders for delivery in second quarter at an advance of 15c. per base box over present official prices. Deliveries by the mills are much retarded on account of the continued scarcity of Tin Bars, which prevents them from turning out normal output. Prices are firm, and while existing conditions would seem to warrant an advance there is no intimation as yet from the American Sheet & Tin Plate Company that such action will be taken. We quote $3.75 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Railroad Spikes.—The demand is enormous, running beyond the capacity of the makers to supply for prompt delivery. In fact, local makers of Spikes are turning down orders almost every day for delivery in the next month or two being sold up beyond that period. The absolute minimum of the market on Railroad Spikes is $2.50 per 100 lb. for indefinite delivery, while $2.60 to $2.75 is quoted for delivery in the next two or three months. It is reported that Spikes for prompt shipment have sold close to 3c. a lb., which is an unheard of price.

Spelter.—The market seems easier and prime grades of Western Spelter are now quoted at about 6.10c., St. Louis, equal to 6.22c., Pittsburgh.

Merchant Pipe.—An inquiry is in the market from the People's Gas Light & Coke Company, Chicago, for 14 miles of 12-in. Line Pipe, and also from the Texas Company of Texas for 20 miles of 6 or 8 in. Line Pipe. The mills are now figuring on these contracts, which are expected to be placed within a short time. New business in Merchant Pipe continues heavy and shows no signs of letting up. The mills are filled up for the next two or three months and are behind in deliveries. There is no change in prices, and, as stated in this report before, Pipe is the cheapest thing

on the whole list, and it is claimed would readily stand an advance of $3 to $4 a ton. The extreme discount on Merchant sizes of Steel Pipe remains at 81 and 5 per cent. off, to the large trade. Official discounts for carloads, which continue to be shaded one point or more, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	%	%	%	%
⅛ and ¼ in.	72	56	69	53
⅜ in.	74	60	71	57
½ in.	76	64	73	61
¾ to 6 in.	80	70	77½	67½
7 to 12 in.	75	60	72½	57
Extra strong, plain ends:				
⅛ to ⅜ in.	65	53	62	50
½ to 4 in.	72	60	69	57
4½ to 8 in.	68	56	65	53
Double extra strong, plain ends:				
¼ to 8 in.	61	50	58	47

Boiler Tubes.—New business is light, as large consumers placed their contracts some time ago, and are specifying quite liberally. Prices are stronger, but are still occasionally shaded to some extent on any desirable tonnage coming up. Official discounts on carload lots, but which are occasionally shaded, are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	45	50
1¾ to 2¼ in.	45	62
2½ in.	50	64
2¾ to 3 in.	57	70
6 to 13 in.	45	62

Iron and Steel Scrap.—The Scrap trade seems to be lagging behind the other markets in the matter of sales, as tonnage changing hands is rather light, and there are no large inquiries. It would seem that with the scarcity and high prices ruling for Steel making Pig Irons, prices on Steel Scrap ought to advance and demand soon improve. Prices as quoted by dealers are about as follows, per gross ton, Pittsburgh: Heavy Steel Melting Scrap, $17.50; No. 1 Wrought Scrap, $19.50 to $20; Old Steel Rails, short pieces for Open Hearth use, $17.50; Old Steel Rails, Rerollers, $19 to $19.50; Bundled Sheet Scrap, $15.75 to $16; Cast Iron Borings, $10.50; Wrought Turnings, $13; Old Car Wheels, $20 to $20.50; Steel Axes, $23, and Iron Axles, $28 to $28.50.

Coke.—The estimated output of Coke in the Upper and Lower Connellsville regions for the first 35 weeks of this year is given as 9,669,959 tons, compared with 8,728,795 tons for the same period in 1905, and 6,346,190 tons in 1904. We note a continued active demand for both Furnace and Foundry Coke, with high prices ruling. Best grades of Connellsville Furnace Coke are held at $2.75 to $2.85 a ton, and 72-hour Connellsville Foundry Coke is held from $3.25 up to $3.75 a ton at oven, sales of several well known brands of Foundry Coke being reported at the latter figure. The labor supply in the Connellsville regions is reported to be a little better, but a shortage in cars is oloming up that may be serious before long.

Cleveland.

CLEVELAND, OHIO, October 9, 1906.

Iron Ore.—Merchant miners in the lake region will watch with considerable interest the development of the policy of the Steel Corporation relative to the ore deposits obtained last week on lease. While the Corporation is not expected to turn seller, its latest acquisitions accent the difference in interest between the Steel Corporation and the Merchant Ore companies that came up early in the season of 1904. The gradual increase in the price of Ore, provided for in the Hill lease, seems to point to a generally higher level for lake Ores, and there is naturally some concern on the part of the merchant furnace interest. Some time ago certain Ore consumers planned to buy a fleet of boats on the lakes, but gave up the proposal when merchant miners refused to sell their Ore product, f.o.b. upper lake ports, thus protecting affiliated fleets. The independent furnace interests have taken the view that an important factor in the cost of Ore is the transportation and dockage charges, and they are now laying their plans accordingly. The Hill Ore lease promises to crystallize into action some of the disturbing comment among the independent consumers of Ore heard during the past two or three years. Ore shipments during September were 4,329,660 tons, showing an increase over September last year of 1,004,110 tons. Shipments to October 1 were 28,150,755 tons, showing an increase over the corresponding period in 1905 of 2,678,149 tons. Last year the October shipments were 4,257,009 tons; November, 3,341,229 tons, and December, 405,060 tons. The movement being duplicated this year the season's total water shipments will be 36,154,053 tons, compared with 33,476,904 tons a year ago.

Pig Iron.—Marked confusion is apparent in the entire Foundry Iron situation, created by the apparent shortage of Iron, not only for delivery during the remainder of this year but also in the first and second quarters of 1907. Prices have risen in consequence. Some speculators in No. 2 Foundry are now selling off their stocks collected some months ago and are getting handsome profits. No. 2 Iron has been sold at $21, at southern Ohio furnace, for delivery in the remainder of this year. This supply does not meet the demand and foundries are frequently compelled to make use of Nos. 3 and 4 for the first time in their history. These grades are bringing $19 to $20 in the Valley. For spot shipment No. 2 Southern Iron is selling at $17 and $17.50, Birmingham, to which is added a freight of $4.10 to make up the Cleveland price. A number of furnaces are withdrawing from the market for first quarter delivery, some of them making the statement that they have reserved practically no Iron for old customers who have not covered. Close buyers have paid $19 for No. 2 Foundry for second quarter delivery, and furnaces have advanced the price to $19.50 for second quarter. No sales have been made so far for third quarter delivery. Southern furnaces are selling No. 2 in this territory on the basis of $15.50, Birmingham. Bessemer Pig Iron producers have been able to keep the market steadier, acting in the interest of stable prices for finished material. Bessemer is scarce even for first and second quarter delivery, but the price holds at $19 in the Valleys. Basic likewise is in light supply and is selling at $18.75 in the Valleys.

Coke.—Furnace Coke is selling for delivery all through next year at $3 at the oven, while for first and second quarter delivery it is sold at $3.25. Foundry Coke sells at $3.75 at the oven.

Finished Iron and Steel.—Although a week ago the negotiations for the purchase by the American Shipbuilding Company of the Ship Owners' Dry Dock was declared off temporarily, the understanding is that negotiations have been resumed, and the deal will be closed during this week. This will carry with it an order by interests connected with the Lackawanna Steel Company for eight new bulk cargo carriers for the lake trade to be delivered in 1908. All of the berths in the meantime have been sold in advance. This promises to prolong the demand for ship Steel on the lakes. The supply of Structural Shapes is still not what buyers would like to see, though the situation is much better than earlier in the year. Occasionally a few buyers are compelled to come upon the market and buy small lots, paying a premium to Eastern mills of $2 to $2.50 a ton. Billets and Sheet Bars are very scarce for delivery during the remainder of this year, and there is even difficulty in getting material for first quarter delivery. This is causing considerable annoyance, especially to the independent Sheet mills, dependent upon the open market for their supply of Steel. Forging Billets are selling at $35 to $36, Pittsburgh, and on Rerolling Billets, when obtainable, the price is $29 to $30 at the mill. Sheets have not been advanced, but the mills are getting behind. Some prompt shipments are reported from new productive capacity, but this is exceptional. Bar Iron is scarce, with prices variable. The official quotation is still 1.60c., Pittsburgh, but mills in this territory are selling at 1.70c., Pittsburgh, and as high as 1.75c., Pittsburgh, is reported for comparatively quick shipment. All mills report considerable difficulty in getting unskilled labor, and this is especialy noted among the foundries.

Old Material.—The market for Scrap is still strong, with prices holding about as they have been for two weeks. Dealers are still buying heavily, and there is some indication of an improved demand on the part of the mills. The following are dealers' prices to consumers, f.o.b. Cleveland, gross tons: Old Steel Rails, $17 to $18; Old Iron Rails, $25 to $26; Old Iron Axles, $20 to $21; Heavy Melting Steel, $17 to $18. Net tons: Cast Borings, $9 to $10; No. 1 Busheling, $15 to $15.50; No. 1 Railroad Wrought, $17 to $18; No. 1 Cast, $16; Iron and Steel Turnings and Drillings, $11 to $12.

Cincinnati.

FIFTH AND MAIN STS., Oct. 10, 1906.—(*By Telegraph.*)

Pig Iron.—Considerable buying has been done during the week both for this and next year's requirements. These sales, however, do not comprise any specially large individual orders, but were made up of numerous small lots. The strength of the market is maintained with a slight movement toward higher prices. Furnace producers, both in the North and South, appear to be strongly entrenched, and are very independent as to whether they sell or not, as the large percentage of them are reported to be practically sold up tight for the rest of this year, excepting now and then a chance accumulation, with order books well covered for several months in 1907. Several large furnaces in the South are said to have withdrawn from the market for any delivery, absolutely refusing to issue any quotations. Production was materially decreased during the recent storm that swept over several of the Southern States, reports showing that at least four-fifths of the producers were compelled to shut down for one or two days. The situation in the South, as far as railroad equipment is concerned with which to move

Iron on contracts, is no better, and is making itself felt more and more as the cold weather approaches. This, in conjunction with the lack of help, is delaying shipments and causing considerable anxiety to consumers generally. The Soft grades are said to be more difficult to obtain than standard Foundry grades, at times commanding a premium. Gray Forge in large blocks is scarce, reports showing several small lots selling at regular quotations. High Silvery Silicon for delivery during the remainder of this year has become exceedingly scarce at almost any price, with no large offerings for next. Birmingham Irons appear to be fairly quotable at $17 to $17.50 for delivery the present year, and from $15.50 to $16 for the first half of next, with perhaps the latter quotation most nearly representing the exact market for next year. One melter in Ohio wants 1800 tons for first and second quarter delivery, and a Michigan buyer asks for prices on about 2700 tons of Southern Nos. 2 and 3 for second quarter delivery. It is reported that a large Pipe company is short of Soft grades, and is in the market for considerable tonnage for nearby delivery. Freight rates from Hanging Rock District to Cincinnati are $1.15, and from Birmingham $3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$20.50 to $21.00
Southern Coke, No. 2	20.00 to 20.50
Southern Coke, No. 3	19.50 to 20.00
Southern Coke, No. 4	18.50 to 19.50
Southern Coke, No. 1 Soft	20.50 to 21.00
Southern Coke, No. 2 Soft	20.00 to 20.50
Southern Coke, Gray Forge	17.25 to 17.75
Southern Coke, Mottled	16.75 to 17.00
Ohio Silvery, 8 per cent	24.15
Lake Superior Coke, No. 1	22.15
Lake Superior Coke, No. 2	21.65
Lake Superior Coke, No. 3	21.15

Car Wheel Irons.

Standard Southern Car Wheel	$26.00 to $26.50
Lake Superior Car Wheel	25.00 to 25.50

Coke.—The market is strong and Coke is in excellent demand. Inquiries and sales running into next year have developed, with quotations firm. We quote the best brands of Connellsville and Virginia Foundry from $3.65 to $3.90, f.o.b. ovens.

Finished Iron and Steel.—Specifications for early delivery are coming forward and considerable contracting is being done for next year. The mills are making deliveries in a very satisfactory manner, and the general situation is regarded as very strong. Bars are in active demand, several of the larger concerns being far behind with their orders. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.73c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.83c., in carload lots.

Old Material.—The demand is active. Dealers are able to dispose of all their Scrap readily at good prices. We quote dealers' prices, f.o.b. Cincinnati, about as follows: No. 1 Railroad Wrought, $17 to $18, net ton; Cast Borings, $8 to $9, net ton; Steel Turnings, $10 to $11, net ton; No. 1 Cast Scrap, $15 to $16, net ton; Iron Rails, $23, gross ton; Steel Rails, rolling mill lengths, $16 to $17, gross ton; Relaying Rails, 56-lb. and upward, $27 to $28, gross ton; Iron Axles, $25 to $26, net ton; Car Wheels, $17 to $18, gross ton; Low Phosphorus, $18 to $19, gross ton.

The Refined Iron & Steel Company.—This company, with offices in the Lewis Building, Pittsburgh, has started its new plant near Coraopolis, Pa., on the main line of the Pittsburgh & Lake Erie Railroad. The equipment consists of 7 double puddling furnaces, 3 heating furnaces, a 22 in. puddle train and 16 in., 12 in. and 9 in. finishing trains. Each furnace is fitted with a vertical boiler furnished by the Bass Foundry & Machine Company, Fort Wayne, Ind. The puddling and heating furnaces are all provided with a patent fire chamber designed by William Stubblebine, manager of the plant, and which is said to produce one-third more heat than can be had in the ordinary furnaces. This fire chamber, we are advised, also eliminates the slag in the puddling furnaces, and the muck bar is said to be entirely free from cinder. The company will make high grade iron bars suitable for stay bolt, chain, nut and cold rivet purposes. J. C. DeNoon is president; I. N. DeNoon, treasurer; Henry F. Gilg, secretary; William Stubblebine, manager, and his son, W. A. Stubblebine, superintendent.

Metal Market.

NEW YORK, October 10, 1906.

Pig Tin.—The firm tone of the London market is considered remarkable when it is known that there have been but few orders sent over from this side, and a further advance from the present high levels would not seem improbable if a heavy buying demand from America should set in. The supply of Tin in this country is low, notwithstanding the fact that imports so far this month have been large, aggregating 1805 tons. There are, however, but 1680 tons afloat. Business transacted during the week has been of larger volume than previously. On Thursday of last week sales were made at 42.45c. Friday the market was lower at 42.30c. On Monday sales were made at 42.60c. and on Tuesday at 42.55c. Tin can be had to-day at 42.50c. The London market closed easy at £195 5s. for spot and £193 15s. for futures.

Copper.—The continued rapid advance of the market on both sides of the water is viewed with no little feeling of anxiety as to its future course, in spite of the comparatively small amounts which have been sold at the high levels. The premiums which are being demanded by the few holders of Copper for this month's delivery, as well as for Copper available for shipment until the end of January, range from 22c. upward for both Lake and Electrolytic. The London market, too, has advanced rapidly, as on Monday of this week the spot market for Standard Copper warrants opened £2 5s. higher than Friday's close, or at £96 5s., and the price of Best Selected advanced from £99 to £100 10s. Sales on that Exchange were in large volume. The market there has since advanced and Standard warants close to-day at £97 for spot and £96 7s. 6d. for futures. Best Selected brands are held at £102. There seems to be considerable Copper available for shipment after February 1 around 20c. to 20½c. Some sales of good volume have been made at this price. We learn of a sale of a carload of Lake last week at 21.75c. for December. Sales of Electrolytic for delivery in Europe are being made to-day at about 22.50c. to 22.75c., f.o.b. American ports. Reports from Germany are to the effect that the high prices ruling there have had no effect on consumption and the situation seems stronger than ever. The activity in the Lake Superior regions is remarkable; a larger force of men is now at work in the Copper camps than ever before, and there is no accumulation of Ore; on the contrary, shipments of the metal are made before it has had a chance to cool.

Pig Lead.—The market is easier; lots of 50,000-lb. can be had at 5.90c. to 5.95c. In St. Louis prices are also easier at 5.85c. to 5.87½c. The London market has advanced sharply, and closes to-day at £19 15s.

Spelter.—Prices are again lower, and shipments can be had from St. Louis at 6.05c. to 6.10c. In St. Louis the market is weak at 6.05c.

Nickel.—The price continues unchanged, large lots being obtainable at 45c.; smaller quantities at 55c. to 60c.

Aluminum.—Although deliveries are very much belated, the principal producer continues to accept orders for future shipments at 36c. for No. 1 Ingots and 34c. for No. 2.

Antimony.—There is a marked scarcity and it is confidently believed that all the Antimony in this country is concentrated in a few hands. Prices show but a slight advance over last week, and we quote the market as follows: Cookson's, 25c. to 25½c.; Hallett's, 24½c.; other brands, 24¼c. The London market declined this morning, but this will have no effect on the present situation in New York.

Ferroalloys.—Foreign manufacturers of Ferrosilicon have withdrawn their prices, which were equivalent to $95 to $98 for 50 per cent., and there is every prospect that higher prices will be named. Ferromanganese is unchanged at $80, at seaboard, but there is a marked scarcity of Ore abroad, and it looks as if higher prices would be the rule before the first of the year. Ferrochrome is unchanged.

Tin Plate.—The course of the foreign market continues to excite more and more interest among American manufacturers and consumers. The advance there has been rapid, particularly so during the past fortnight, due to the placing of large buying orders for delivery on the Pacific Coast of this country, the Northwest teritory of Canada and the Far East. Oil Plates are in the largest demand and for 18¾ x 14 in. 14s. 3d. is now quoted, as compared with 13s. 6d., which was the ruling price a month ago. Welsh Plates are 3d. higher, and are quoted at 14s. These prices are exceptionally high, but if a famine occurs in the Iron and Steel industry in that country, as seems imminent, prices will undoubtedly be forced to a still higher level. The leading interest has not yet advanced the price of Tin Plate. For 100-lb. IC Coke Plates $3.94, f.o.b. New York, and $3.75, f.o.b. Pittsburgh, is quoted, subject to the usual trade discounts.

Old Metals.—The market is very irregular, but exceedingly strong. Prices from two different houses may show a considerable variance even on the same day. The following dealers' selling prices represent the range for New York City

deliveries, but prices in many instances are determined by the question of deliveries:

	Cents.
Copper, Heavy Cut and Crucible	20.00 to 21.00
Copper, Heavy and Wire	19.50 to 20.50
Copper, Light and Bottoms	18.50 to 19.00
Brass, Heavy	14.00 to 14.50
Brass, Light	11.75 to 12.25
Heavy Machine Composition	18.00 to 18.50
Clean Brass Turnings	13.00 to 13.50
Composition Turnings	15.50 to 16.00
Lead, Heavy	5.65
Tea Lead	5.40
Zinc Scrap	4.75

New York.

NEW YORK, October 10, 1906.

Pig Iron.—During the past 10 days sales of Basic Pig Iron have aggregated about 125,000 tons, this including 69,000 tons for the Pencoyd Works, all but 7000 tons being for next year's delivery and meeting the demands of the plant until July 1. For this year's delivery other eastern Pennsylvania and New Jersey works have bought 19,000 tons at prices ranging up to $19.85, delivered. For 1907 there have been booked one block of 25,000 tons and another for 10,000 tons. Prices have been on a rising scale, and furnaces are now asking $19 and upward for forward delivery. There have been some good sales of Foundry Iron, including one lot of close to 10,000 tons for a producer of railroad castings, for next year's delivery. Some of the Cast Iron Pipe makers have been buyers for 1907. We quote for tidewater delivery as follows: Northern Foundry, No. 1, $22.50 to $23 for prompt and $21.50 to $22 for the first half of 1907; No. 2, $22 to $22.50 for prompt and $21 to $21.50 for forward delivery. Southern Iron is sold at $21 to $21.50 for No. 2 Foundry for early delivery and $19.50 to $20 for 1907.

Steel Rails.—Large transactions are few, the heavy inquiries on behalf of Southwestern railroads not yet having come to the contract stage. Traction lines are still buying, the business reported including 6000 tons for the Chicago & Southern Traction Company and 2000 tons for the Meadville & Conneaut Lake Traction Company. Several sales of 1000 and 500 tons have been made. The Tennessee Coal, Iron & Railroad Company will entertain no more contracts for 1907, the time of completing the improvements now under way at its Steel works not being determinable as yet. Should a considerably increased Steel output be available by the spring of 1907, it is possible that more Rail tonnage will be taken.

Structural Material.—The largest contract for the week is that for the new Singer Building on Broadway, below Cortlandt street. This has long been upon the market, the tonnage being between 7000 and 8000 tons. For the new Academy of Music in Brooklyn, a 2000-ton job, the general contract has been given to John Thatcher, and it is expected that the Steel erection will be in the hands of Post & McCord. The American Bridge Company has booked 900 tons of bridge work for the Virginia & Southwestern Railroad, 700 tons for the Chicago Junction Railroad and 500 tons for a bridge over the Allegheny River near Pittsburgh. The New York Central has pending several small bridge contracts, and the New Haven road will place a number of plate girder bridges. Structural mills are not doing all that their customers could ask in the way of deliveries, but some of them can execute orders in four to six weeks. We quote as follows on mill shipments, tidewater delivery: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. the extra is 0.10c., and on Angles over 6 in., 0.10c. Beams and Channels out of stock are sold at 2¼c. to 2½c.

Bars.—A determined effort is to be made within a few days to start the Eastern rolling mills which have been closed by strikes since July 1. It is possible that quite a number of these mills will resume operations on Monday with a new force of workmen if the old hands are not willing to resume at former wages. The Bar Iron market is strong, with the minimum 1.60c., Pittsburgh, or 1.74½c., tidewater, while some of the Eastern mills are asking 1.70c. at mill and are stated to be taking business on this basis. The demand is excellent also for Steel Bars, on which the minimum is 1.64½c., tidewater, but for reasonably early delivery a considerable premium over this price must be paid.

Plates.—Business is considerably better, and the tonnage of new orders now being taken is running well above the average for August or September. The local consumers of Plates are busier than during the summer months, and consequently their needs have correspondingly increased. Quotations are firmly held as follows at tidewater on carload shipments: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Firebox Plates, 2.24½c. to 2.60c., according to specifications.

Pipe.—The pressure continues and more buyers are placing orders for delivery next year than has ever before been the case at this season. A great shortage of Pipe has developed for this fall's requirements, and consumers are scouring the country trying to get small lots to supply their immediate needs. Pipe manufacturers are getting inquiries from unusual localities, and in noteworthy instances from foreign countries, owing to the fact that foreign Pipe makers are also crowded with work. An inquiry is in the market from Peru for 15 miles of Cast Iron Pipe for one water works. Prices quoted for next year's delivery are firmly maintained on the basis which has hitherto prevailed for fall and winter shipments. The minimum on carload lots of 6-in. is $32 per net ton at tidewater.

Old Material.—The greatest strength shown in the Old Material market is displayed in Heavy Cast Scrap, Stove Plate, Cast Borings and Wrought Turnings. These grades are fully 25c. per ton higher on the average than last week. Sales of Heavy Melting Steel Scrap in blocks of 5000 tons or more, and aggregating at least 25,000 tons, have been made to a number of Steel mills in eastern Pennsylvania at $18 to $18.50, delivered. Some consumers of this material are desirous of making purchases for delivery running over the first quarter of next year, but the dealers do not seem willing to entertain the inquiries, far less to make quotations on such deliveries. It is further rumored that sales of large lots of Heavy Melting Steel Scrap which were made to a new Steel works in this vicinity some time ago were sold by parties who are now having much difficulty in making deliveries, and are offering $1 to $1.50 per ton more than the price at which the contracts were made. All the railroad companies are offering much more Scrap this month than for some time, because they are cleaning up everything on account of the approach of winter. This may prevent them from having any large offerings after this month. Stocks of Heavy Cast Scrap, Stove Plate and Heavy Melting Steel Scrap were never so low in this vicinity as at present, and leading dealers anticipate higher prices before November 1. The strength of Pig Iron has had a marked influence in advancing the prices of Scrap. Taking Pig Iron as a basis to-day, Cast Scrap is estimated by the trade to be about $2 per ton lower than it should be, and it is generally expected that it will make a further advance to get in line. Approximate prices for New York and vicinity, per gross ton, are as follows:

Old Iron Rails	$24.00 to $24.50
Relaying Rails	27.00 to 28.00
Old Steel Rails, rerolling lengths	18.50 to 19.00
Old Steel Rails, short pieces	16.25 to 16.75
Heavy Melting Steel Scrap	16.25 to 16.75
Standard Hammered Iron Car Axles	29.00 to 30.00
Old Steel Car Axles	22.00 to 22.50
No. 1 Railroad Wrought	20.50 to 21.00
Iron Track Scrap	18.00 to 18.50
No. 1 Yard Wrought, long	18.50 to 19.00
No. 1 Yard Wrought, short	18.00 to 18.50
Wrought Pipe	14.50 to 15.00
Light Iron	10.00 to 11.00
Cast Borings	10.00 to 11.00
Wrought Turnings	13.00 to 14.00
Old Car Wheels	18.50 to 19.00
No. 1 Machinery Cast	16.50 to 17.00
Stove Plate	13.50 to 14.00
Grate Bars	12.50 to 13.00
Malleable Cast	17.00 to 18.00

The Carnegie Steel Company has placed a contract with the Pennsylvania Engineering Works, New Castle, Pa., for a three-high 28-in. blooming mill, to be installed at the Donora Works, Donora, Pa. This plant is equipped with a 40-in. blooming mill and the smaller mill is to be added to get a better range of sizes for the rod and wire mills. The steel building to contain the mill will be erected by the American Bridge Company, while the Wisconsin Engine Company, Milwaukee, will furnish the engines. Four additional soaking pits will be installed and these will be erected by the Carnegie Company. A 15,000,000-gal. pump will also be built and will be furnished by the Wilson-Snyder Mfg. Company, Pittsburgh.

The Enterprise Boiler Company, whose plant at Youngstown, Ohio, was burned some months ago, did not buy the plant of the Girard Boiler Company, Girard, Ohio, which was sold at public sale on Monday. The Enterprise Company has been operating this plant under lease for some time and will continue to run it until it has made plans for building its own plant. It has been offered numerous free sites for a plant, but has not yet decided upon a location.

The National Association of Manufacturers has arranged to hold its annual convention at Madison Square Garden, New York, the last week in October.

Iron and Industrial Stocks.

NEW YORK, October 10, 1906.

The event of the week was the announcement of the completion of the ore deal between the United States Steel Corporation and the Great Northern and Northern Pacific interests. This stimulated the prices of United States Steel stocks, but not to the extent that had been anticipated. The common stock, which sold at 46⅝ on Thursday, touched 49¼ on Saturday and Monday, while the preferred stock, which had sold at 106½ on Thursday, touched 108¼ on Saturday and Monday. The most spectacular performance of the week, however, was in General Electric stock, which advanced from 167 on Thursday to 184 on Tuesday. The cause of this movement is understood to be a prospective increase in the stock of the company and allotments to be made to stockholders in proportion to their holdings on the basis of par value. The allotment is expected to be of such size as to afford a very substantial dividend. The range of other active stocks during the week was as follows: Car & Foundry common, 44⅜ to 46½; Locomotive common, 73½ to 77⅝; Colorado Fuel, 55 to 58½; Pressed Steel common, 53⅜ to 55; Republic common, 38 to 39¼; Sloss-Sheffield common, 73½ to 76; Tennessee Coal, 157 to 162½; Cast Iron Pipe common, 48½ to 50¼. Last transactions up to 1.30 p.m. to-day were made at the following prices: Car & Foundry common 46⅛, preferred 102; Locomotive common 77⅛, preferred 112¾; Steel Foundries common 10½, prefered 44; Colorado Fuel 57⅛; General Electric 181¼; Pressed Steel common 54¾, preferred 98; Railway Spring common 54; Republic common 38½, preferred 98½; Sloss-Sheffield common 75⅛; Tennessee Coal 162; United States Cast Iron Pipe common 49½, preferred 90; United States Steel common 49, preferred 107¾; Can common 6½, prefered 56½.

The Sharon Sheet Steel Company, organized at Sharon, Pa., about five years ago, and afterward taken over by the United States Steel Corporation, has issued notice that on November 1 it will pay off all of the $324,000 worth of first mortgage 5 per cent. gold bonds which were issued when the company organized.

Dividends.—The Vulcan Detinning Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable October 20.

The Morse Twist Drill & Machine Company has declared a quarterly dividend of $2.50 per share.

The Tuthill Spring Company, Chicago, Ill., has declared its annual dividend of 8 per cent.

The Chicago Pneumatic Tool Company has declared the regular quarterly dividend of 1 per cent.

Improvements at Duquesne and McKeesport.

The Finance Committee of the United States Steel Corporation on Wednesday authorized the immediate beginning of work on improvements at Duquesne and McKeesport. At the former steel works there are to be built two new blast furnaces, 18 60-ton open hearth furnaces, a new 16-in. mill and the remodeling of the 10, 20 in. mill, with 20-in. roughing train and 10-in. finishing train. At McKeesport a new blast furnace is to be built. These betterments are quite apart from the annual programme of improvements, which is now being drawn up by the constituent companies and which will not come up for consideration before December.

Liability to Agents.—The Fox Machine Company and its allied interest, the Fox Typewriter Company, Grand Rapids, Mich., have been awarded a decision by the Michigan Supreme Court, which involves a question of some importance to other manufacturers who have dealings with agents. In 1890 James B. Stone took up the sale of the Fox universal trimmer in Europe, having headquarters in London. The business continued until 1899 when the parties settled the account between them, and a written agreement was entered into whereby Mr. Stone was to continue the sale of the trimmers in Europe and prosecute the business faithfullyy in accordance with previous experience. In May, 1902, the business of the Fox Machine Company was taken over by the Fox Typewriter Company, but no mention was made of the Stone agreement, the manager of the new company assuming that it had expired but continuing sales to Mr. Stone. The business under this contract was not prosecuted satisfactorily to the Fox Company, who complained that Mr. Stone was neglecting the business on the Continent of Europe, and therefore was not entitled to exclusive rights in that territory. In consequence some sales were made by the company directly to parties in Europe. Mr. Stone, claiming that he had the exclusive right to the sale of the trimmers in Europe until the contract was canceled, regardless of the manner in which he prosecuted it, sued the company for an accounting and for violation of the agreement, claiming $25,000 damages, and obtained a preliminary injunction restraining the Fox Typewriter Company from advertising, quoting prices or selling trimmers on the Continent of Europe. Defense was made by the company, but the lower court rendered a decree canceling the contract and awarding $5000 damages to Mr. Stone. The case was appealed to the Supreme Court, which held that the complainant did not use due diligence as the contract required, that his failure to obtain larger business was due to his own acts and dismissed the bill, assessing on him the cost of the litigation.

A very acceptable favor to those whose business is placing contracts is Zevy's Engineers' Contract Book, which the Goheen Mfg. Company, Canton, Ohio, is distributing, with its compliments, to the trade. It is a large paper covered book, 18 x 23 in. in size, containing several sheets, giving ruled forms for recording itemized statements in keeping track of the condition of contract work. One set of pages is devoted to streets, sewers and sidewalks, and has headings for almost every conceivable classification into which the work may be subdivided. Other ruled pages are laid out for pipe work, machinery, building, foundations, indoor and outdoor construction, and equipment and building specifications alone. The reverse side of each sheet contains specification forms for paint work, particularly the painting of exposed structural work, and the fly leaves of the book call attention to the products of the Goheen Company, including oxidized carbon cement for filling pittings in iron and steel work, Galvanum for protecting galvanized iron, Old Honesty paint for outdoor work and carbonizing coating for preserving iron and steel. A large number of illustrations show work on which these various products have been employed.

An increase in blast furnace capacity in the Pittsburgh district was made in September by the blowing in of one Carrie and one Donora furnace of the Carnegie Steel Company after relining. One Edgar Thomson Spiegel furnace was also blown in in September and in the latter part of the month went on to Bessemer, so that all the 11 stacks at Edgar Thomson were then making Bessemer iron. The new Midland furnace started up on September 8. Furnace B, of the National Tube Company, McKeesport, Pa., was blown out September 4 for relining and repairs.

An experimental gas turbine, which under test showed an efficiency of 18 per cent., has recently been constructed in France. It is of the impulse type, and the casing is lined with refractory material. An expanding nozzle is used through which the gasoline is fed under pressure, being ignited by electricity, which generates a temperature of combustion of over 3000 degrees F. Low pressure steam is admitted into the casing while the blades are rotating to cool them to a certain extent.

We are officially advised that the report is untrue that the Youngstown Sheet & Tube Company, Youngstown, Ohio, has definitely decided to build two new blast furnaces. It will build two or more furnaces at some time, but no definite plans have yet been made.

The Pittsburgh & Lake Erie Railroad has placed a contract with the Standard Steel Car Company, Butler, Pa., for 1000 steel gondola cars for delivery next year.

The Machinery Trade.

NEW YORK, October 10, 1906.

The demand for machinery, which is already overtaxing the capacities of the shops, is apparently on the increase, and many manufacturers are preparing to make enlargements in order to cope with the increasing demand for their products. Users of machinery are also building additions that will necessitate the purchase of large quantities of machine tools, and from the new projects coming forward it is evident that the demand for machinery is growing rapidly. Among the latter the railroads figure prominently, as do also the engineering and contracting companies, who have and are figuring on large jobs. Some of the railroads have under consideration the erection of additional shops of large proportions, the requirements for which will include large quantities of machine tools and power plant equipment. It is expected that the contractors will become more important factors in the machinery trade very shortly, as it has been decided to construct the Panama Canal by contract. This work will probably be given to several contractors, each of whom will have to purchase a great deal of equipment to do the work. It will be remembered that a year or so ago some of the contracts were let for the construction of the $101,000,000 barge canal, and that those who were awarded the contracts purchased a great deal of machinery. As the Panama Canal work is of much greater magnitude it will be seen that those who do the work will have to install quite extensive plants.

Superintendent Franchot of the State Department of Public Works, Albany, N. Y., has advertised for bids on four contracts for the Erie barge canal, the first for work to be done in Niagara County and the other three in Washington County. These contracts are said to be among the most important in connection with the canal project and based on the engineers' estimate they aggregate nearly $4,000,000.

It is likely that when the United States Steel Corporation begins to put out its specifications for mining machinery the conditions in that branch of the trade will be very similar to those that exist in the machine tool line at present. While mining machinery men, as a rule, are about keeping up with their orders they have all they can do to provide for the present demand, and an influx of business, such as that promised by the Steel Corporation's appropriation, will mean that many of the plants now devoted to the production of mining equipment will find themselves considerably behind in their work. This will also apply to the manufacturers of pumping equipment and hoisting machinery, and it is probable that the conveying machinery men, who are already rushed with work, will be obliged to do considerable hustling to promise anything like good deliveries.

The fact that there is an unusual number of large power projects under way, especially in the electric street railroad line, has done considerable toward abating the rate cutting that prevailed in the trade during last winter and the early spring. While there have been instances all summer of the three leading interests indulging in a war of figures they have not been as frequent as previously. There are still isolated cases of rate cutting, but they are so infrequent that the average heavy engine builder is not much worried. This is accounted for by the fact that there is business enough for all hands, and incidently the question of delivery has surmounted the question of prices in many instances, with the result that the man who could deliver the quickest at a reasonable price was given the contract even where there were offers to undersell him, provided a longer time be given for filling the order. The conditions which for some time caused many engine builders to refuse to bid where certain companies had prices in on a job have practically disappeared of late and the general trade is well satisfied with the outlook.

The recent increases in the price of machine tools have had their effect on the second-hand market, and everything in the way of machine tools that can be put into good condition is bringing a price. Second-hand tools for quick delivery are being sold at such high figures that the difference between their prices and list prices of machine tools is so slight as to be hardly worthy of notice, and when a machine is wanted at once it is wanted so badly that the purchaser is willing enough to pay what is asked. The scarcity of second-hand equipment is so apparent that men in that line are out hunting for such machinery, where in other days the man with second-hand machinery for sale was obliged to hunt up the dealer.

Standard Roller Bearing Company Expanding.

Samuel S. Eveland, on behalf of the Standard Roller Bearing Company, Philadelphia, Pa., of which he is vice-president and general manager, has purchased the entire plant and real estate of the Pennsylvania Iron Works Company, which adjoins its property. By this purchase the Standard Roller Bearing Company has secured five factory buildings, with a total of over 110,000 sq. ft. of floor space, and real estate 120 x 1600 ft., all located on the main line of the Pennsylvania Railroad and connected with the property which the company now occupies, making the total length of all of its property over ½ mile, with an average width of 200 ft., covering 500,000 sq. ft. of floor space. The price paid for the property was nearly $250,000, and it will be immediately equipped with a full line of machinery at an expense of over $200,000. In addition to this property the company is erecting what is said to be the largest reinforced concrete building in Philadelphia or vicinity, five stories high, 100 x 200 ft. This building will be devoted exclusively to the manufacture of annular ball bearings, automobile axles, &c. During the past few months a crucible steel casting plant and an iron and brass foundry have been built and equipped, and a drop forge plant, 100 x 150 ft., has just been completed, which is fully equipped with Billings & Spencer drop hammers. In this building the company will in the future manufacture all its drop forgings used in automobile axles, &c. The company now has in operation the largest and most complete plant in the world for the manufacture of automobile axles and ball and roller bearings. It manufactures its own steel balls, brass, iron and crucible steel castings, and in fact everything that goes into its products except the raw material, such as bar steel and iron and copper for its gray iron and brass foundries. Over 1200 hands are now employed and as soon as the new reinforced concrete building is in full operation, which will be within 30 days, over 1800 men will be employed. When alterations are completed to the Pennsylvania Iron Works property, 3000 hands will be at work. For the completion of all these improvements the company will purchase a large quantity of machinery. During the past week the company has purchased considerable machinery, but it is understood that the main requirements have not yet been provided for.

The Union Pacific Railroad has awarded contract for the construction of its main shops at Omaha, Neb., to include a car shop, 300 x 600 ft., with an L 200 x 300 ft.

The Smyrna, Kent County & Delaware Bay Traction Company, Smyrna, Del., will soon ask bids for the erection and equipment of a new power house, car barn and machine shop.

A universal milling machine, iron planers, one-spindle upright drills, disk grinder and 5 to 30 hp. motors are required by the Lancaster Machine & Knife Works, Lancaster, N. Y., to equip the additions to its plant which the company is now building. The main building is being extended 40 x 75 ft., and the forge shop and grinding room, 40 x 90 ft., two stories.

The Public Service Corporation of New Jersey has awarded contracts for the erection of a car barn and repair shop at Camden, N. J., and it is understood that a good assortment of machine tools will be needed to equip the shop. Henderson & Co., Limited, Philadelphia, Pa., have the contract for the buildings, which will be brick structures, one and one-half stories high. The car barn will be 137 x 321 ft., and the repair shop 138 x 255 ft. It is understood that the shop will be equipped with one or two large lathes, drill presses, perhaps a small crane and a general assortment of machine tools. There is some machinery equipment in an old repair shop at Camden which will be utilized in the new shop, but that does not amount to a great deal, and it is expected that the company will do considerable buying for the equipment of the new plant. The buying will probably be done at the company's office, 207 Market street, Newark, N. J., where the chief engineer is established.

Chicago Pneumatic Tool Company to Issue Machinery List.

A good sized list of machine tools is being prepared and will be sent to the trade shortly for bids by the Chicago Pneumatic Tool Company, 95 Liberty street, New York, which requires the machinery to equip the proposed extension to its machine shop at its air compressor works at Franklin, Pa. The sales of compressors by this company have for a long time so far exceeded its capacity that it has been endeavoring to get an increased capacity without disturbing the arangement of its plant. Only recently a large addition was built and equipped, but it proved inadequate. To secure the much needed room the company has decided to convert its foundry into a machine shop and to connect it to the main machine shop by a small building, making one continuous machine shop, 120 ft. wide and 685 ft. long. A new foundry will be built later to take the place of the one which is to be converted into a machine shop. The present capacity is 50 to 60 air compressors a month, and when the works have been rearranged the company will be able to produce 75 compressors a month. Even with this increase it is a question whether the company will be able to keep up with

the orders which are coming in, the volume of orders received this month so far being equal to the full month's capacity. It will not be surprising to hear of further enlargements of the company's facilities for the manufacture of air compressors and drills.

A new plant is in course of erection at Twelfth, Thirteenth and Monmouth streets, Jersey City, for the Cockburn Barrow & Machine Company, which is to be consolidated with the Stayman Mfg. Company, and the products of both concerns are to be made there. The plant is to be a large one and it will be particularly complete, both in the manner in which the structures are erected and the machinery equipment. The buildings are to be of reinforced concrete and they are being erected by the Underwriters' Engineering & Construction Company. There will be a main machine shop, 75 x 160 ft., with a galley for lighter machine tools. The shop will contain among other equipment a 25-ton electric crane and some large lathes, boring mills, bending rolls and light machinery. There will be a blacksmith shop, 60 x 65 ft., two stories in hight, which will contain steam presses, steam hammers and a general assortment of up to date blacksmith shop equipment. A building to be used for assembling, pattern department and light machine shop and storage purposes will be 25 x 200 ft., two stories in hight. The boiler and power house will be 40 x 80 ft., and will contain 300 hp. of boilers and about 250 hp. of engines. There will be two 75-kw. generators and all that goes to make a first-class power house. All the machinery will be electrically driven and a contract has been made with the Westinghouse Electric & Mfg. Company for that part of the equipment. The power house equipment has also been arranged for and it is expected if possible to begin operations at the plant by December 1. All the lines now being turned out by the two companies will be made at the new plant, including tubular frame wheelbarrows, punching machines, steam hammers, derrick fittings, concrete machinery, dump cars and buckets, piston valves, steam engine pistons and general forging and machine work. Both companies now maintain executive offices at 95-97 Liberty street and the executive staff consists of W. O. Hickok, 4th, president; T. M. Carnegie, vice-president; G. M. Clark, secretary and treasurer; W. McIlvrid, general manager; J. A. Scott, consulting engineer.

It will not be long before the Bethlehem Steel Company comes into the market again for a good assortment of machinery for another proposed extension, judging from all accounts. The company is said to have decided to make an addition to its already large forging department and its engineers are now working on the plans. It will be remembered that the company quite recently built an extensive forging department, a large section of which was devoted to the manufacture of drop forgings in the line of automobile fittings. That trade has grown to such an extent that the work devoted to that line has crowded other departments and it has been decided that another addition is badly needed. The size of the proposed addition has not been decided upon as yet, but it is admitted that it will be a large building, and if the plans now being talked over are carried out a large list of inquiries may be looked for. The Bethlehem Steel Company has been a good, steady buyer for several months past and has contributed largely to the prosperity of the trade in this section. It is known in the trade that the major part of the equipment for the company's new structural mill has been contracted for, and the buying for that particular department will be confined to equipment and supplies of a less important nature.

Fire Engine Company to Extend.

The American, La France Fire Engine Company, Elmira, N. Y., has decided to concentrate all of its manufacturing interests in that city, and the plants that the company now operates at Cincinnati and Seneca Falls will be moved to Elmira as soon as some extensive alterations and additions are completed at the Elmira manufactory. When the work is done the company will have the largest fire engine and fire apparatus manufacturing establishment in the United States, if not in the world. The improvements under way include the remodeling of the company's existing plant as well as the erection of a building, 65 x 532 ft., which will be used for an erecting shop, storage and woodworking department, boiler room and testing department. The building will be three stories in hight, and the woodworking department and other light manufacturing will be done on the upper floors. The plans include the construction of an office building, 60 x 120 ft., three stories in hight, and a two-story blacksmith shop, 50 x 90 ft. There will be a brass foundry and other buildings of smaller size, which will go to make up the large general plant. The power house will be separate from the main structure, and the company proposes to add about 350 kw. of power to its present capacity. The general plans for the building were made by F. R. Slater, who has offices at 100 Broadway, and he has forwarded them to the company's main offices at Elmira, from where it is understood all of the buying will be done. Mr. Slater will have charge of the construction and equipment of the buildings, however, and will act in an advisory capacity to the company's engineering force. The company will build some of the special machinery used in manufacturing its engines, and will move some of the equipment now at Cincinnati and Seneca Falls to the new plant. In addition to this it is expected that considerable will be needed in the way of machine tools and general machinery equipment for the blacksmith shop and foundry. Work has already been begun on the additions, and it is hoped that the buildings will be completed and equipped within six or seven months.

The Canada Forge Company, Limited, Welland, Ont., has been organized by gentlemen prominently connected with the Titusville Forge Company, Titusville, Pa., to manufacture principally high grade open hearth steel forgings of every description in the rough or finished, weighing from 10 to 10,000 lb. The company will break ground this week for the erection of its plant, which will be located at Welland and which will consist of two main buildings, a forge and machine shop, both of which will be equipped with modern machine tools driven by electric power, and steam hammers and heating furnaces of the latest and best designs for the manufacture of forgings. Thomas J. Dillon, who was formerly secretary and superintendent of the Titusville Forge Company, has resigned that position to assume the management of the new company. The officers are: Thomas J. Dillon, president; John L. Emerson, vice-president; Frank Hesch, secretary and treasurer. The Board of Directors consists of E. O. Emerson, John L. Dillon, E. O. Emerson, Jr., J. T. Dillon and Thomas J. Dillon, all of Titusville, Pa.

The Howard Motor Works, with main office and salesroom at 18 Dey street, New York, has incorporated, with a capital stock of $25,000, to manufacture the Howard gasoline engine for marine and automobile purposes. The company maintains a plant at Yonkers, N. Y., and already has a large number of orders on its books for 12, 25 and 50 hp. marine engines. The engine which it builds is of the Mercedes type and is made in from 8 to 75 hp. It is made in two different styles, that for the automobile having an aluminum base. H. F. Frevert is president and W. S. Howard secretary and treasurer.

Large Power Requirements.

Western interests are spending a good sum of money in the power line just now and there are a number of large propositions before the local market for Western delivery. The American Cotton Oil Company, which has been putting out inquiries for something like 3000 hp. of power equipment, has closed, it is understood, for some of its requirements and particularly the boilers, which went to a leading interest. The General Chemical Company, 25 Broad street, is also buying extensive power machinery for a Western project. The first named company, it is understood, is acting for a large Western machinery house, while the destination of the other purchases is not disclosed.

Specifications will shortly be issued for power and machinery equipment to be purchased by the New York, Auburn & Lansing Railroad, which is building a third-rail high-speed trolley line from Ithaca to Auburn, N. Y. The company proposes to erect a power house near Genoa, N. Y., which will be equipped with two units, each of 800 or 1000 kw. turbine engines and generators. The company will also buy corresponding water tube boilers, pumps, condensers, feed water heaters and equipment for three substations. The dimensions of the proposed power house have not been decided upon nor has the company planned its machine shop as yet. It is understood, however, that the shop will be built in conjunction with the car barn at the Auburn end of the line, and some equipment now used in an existing machine shop will be installed in the new structure. There will be some machine tools to buy, however, but the power equipment will be purchased first. W. L. Fairchild, 15 Broad street, New York, is the engineer in charge and he is preparing all of the plans for the road and is superintending the construction of the road bed, which is already well under way.

The city of Yonkers, N. Y., it is learned from authoritative sources, will soon ask bids on a 6,000,000-gal. pumping engine and other appurtenances for the improvement of its pumping plant. It is understood that the bids will be opened some time in November, and the trade can look for the advertising of the work almost any day.

T. S. Napier & Co., 462 Broome street, New York, are getting equipment for a power house in course of construction at Sidney, N. Y. The company has inquiries out for a 60-hp. engine and other power equipment, and it is understood that bids will be closed very shortly.

The Duncan Company, 300 Broadway, has been making some inquiries in the trade for equipment for an electrolytic plant to be erected near Mechanicsville, N. Y. The company is getting bids among other things on a 450-kw. electric generator and four or more electric motors. It is understood that the equipment is intended for a power house, 70 x 100 ft., and an electrolytic building, 80 x 275 ft. The structures are to be used by a paper company.

The Latshaw Pressed Steel & Pulley Company, Pittsburgh, has made arrangements with R. R. Street & Co. to act as distributers and carry a stock of the Latshaw split pulley in Chicago.

New England Machinery Market.

WORCESTER, MASS., October 9, 1906.

The manufacturers of shapers have followed the trend of the market and have marked up their prices 5 per cent. In addition to lathes, planers, drills (both upright and radials) and milling machines, other instances are reported of higher prices, the advance being 5 per cent. as a rule, though in exceptional cases it has gone a little higher. A few lines remain unchanged, partly because prices had already been put where they should be and partly because the makers of certain types of tools have felt unable to advance prices to a level with prevailing conditions on account of competition. In these latter instances the tendency is growing to disregard the prices of competitors and keep with the market, in the realization that there is enough business for all; and though present business may be lost by prices higher than those of competitors, yet in the long run advantages of delivery will even up the volume of business and produce greater and fairer profits.

No changes in general conditions of business are apparent. Deliveries are as bad as they have been, and in some instances worse. The higher prices are not affecting the volume of inquiries and orders.

The New England power boiler manufacturers are still complaining of the condition of business. Their works are full, as is usually the case at this time of year, but much of it is repair work and other lines which do not come strictly under the head of boilers. It is stated that competition has gone to extreme limits in this section of the country until prices are lower than they should be, considering the cost of the materials which enter into a boiler. Neither is there the same demand for boilers that might be expected, considering the general condition of the manufacturing business. A few shops have all they can do on straight boiler work, but the business was not procured at the prices which they would like to have obtained and which they would have got in a market where competition has not reached so acute a stage.

Projects for the building of plants for the manufacture of artificial ice are springing up on all sides owing to the high prices for the commodity which have prevailed in the new England cities where usually the dealers have been contented with rather moderate figures as compared with other sections of the country. The ice crop was a short one last winter and this caused the high cost to the consumer. The result has been to call a great deal of attention to artificial ice in cities where the supply of natural ice has always been so large and of such good quality as to keep the subject in the background. Now that the people have been awakened to the artificial product companies have formed and capital easily secured for the establishment of plants. The manufacturers of ice making machinery have been active and the total resultant business for them should be large.

The Fore River Shipbuilding Company, Quincy, Mass., has asked for preliminary bids for the machine tools which will constitute the equipment of the workshops of the cruisers Birmingham and Salem. The list consists of two 16-in. screw cutting back geared extension gap lathes, 7 ft. between centers; two screw cutting 12 in. back geared tool room lathes, 4 ft. between centers; two column tool room shapers, 13-in. stroke, 15-in. traverse; two upright drills to drill up to 1½ in., with 14-in. traverse of spindle; two universal milling machines, 18-in. longitudinal feed and 13-in. vertical movement; combined punch and shears, 6-in. shear blades, to cut ¾-in. round and shear ⅝-in. steel and punch ⅝-in. holes in ⅝-in. mild steel plates; two emery grinders on column with attachment for surface grinding.

The Burlington Light & Power Company, Burlington, Vt., proposes to develop a great water power on the Winooski River at Essex Junction, Vt. The necessary rights have been purchased, to develop, when the maximum is taken advantage of, between 5000 and 10,000 hp. The Burlington Company proposes to begin the development of the property at an early date, according to the dispatches.

The New York, New Haven & Hartford Railroad has notified the Mayor of Boston that it is to take up the question of the electrification of all of its Boston suburban systems as soon as the similar work at the New York end of the system has been worked out. When this is done it will be necessary to increase greatly the company's power facilities in the vicinity of Boston.

There is a good deal of interest in the announcement that the General Electric Company is to increase its capital stock, the matter now being in the hands of a committee which will work it out for action in the immediate future. It is said to be a strong probability that the balance of stock authorized will be issued, amounting to $5,744,000. The company is carrying out new construction at its several plants which will add about 600,000 sq. ft. to the floor area and will cost with equipment about $5,000,000, and the proceeds of the sale of the new stock will pay for these enlargements. The gross business of the current year will reach $55,000,000, according to statements in financial circles, which is the largest that the company has done; but, it is added, the ratio of profits to the total business will be somewhat smaller, due to competition and also in part to gradual settlement of the industry to a more stable basis. Those who are in touch with the growth of this great industry believe that next season's enlargement of the works, both at Schenectady and Lynn, must equal those of the present season, which will again make the company an important factor in the machinery market. If business keeps up to its present general level further additions on a large scale will certainly be necessary.

The Wilkinson Steam Turbine Company has been incorporated in Maine with authorized capital stock of $1,000,000. The organization is a temporary one as named in the corporation papers. The Wilkinson steam turbine is controlled by the International Power Company, and the experimental work has been done at the works of the American & British Mfg. Company, Providence, a subsidiary company. Consequently it is deduced that the Wilkinson Steam Turbine Company will be controlled by the International Power Company.

The Pierson & Dean Company, 42 Church street, New Haven, Conn., has been organized to manufacture switchboards and panel boards, and to develop electrical and electro mechanical devices for machinery manufacturers. The company has its factory pretty well equipped, it states, but it would be glad to receive information and catalogues describing tools for any kind of light metal working. W. F. Dean, who has conducted the business individually, is secretary and treasurer.

The Barnard Briggs Motor Car Mfg. Company, Boston, which is to equip a large factory at Woodville, Mass., for the manufacture of automobiles, as stated in this column last week, has been incorporated in Massachusetts with authorized capital stock of $250,000 and the following officers: President, J. L. Briggs, Taunton, Mass.; treasurer, A. H. Barnard, Waban, Mass., and clerk, Harry L. Palmer, Cambridge. The company states that it will spend $100,000 on new equipment, but is not yet ready to place its orders.

The Bryant Electric Company, Bridgeport, Conn., manufacturer of electrical goods, has taken out a building permit for the construction of a one-story addition, 41 x 153 ft., to be used for a buffing and plating department.

The Boston Tool Company has been organized to take over the business of Louis F. Carlow, 207 Bridge street, Cambridge, Mass. It will make special machinery, dies, stamping and press work. The company is incorporated in Massachusetts with $10,000 capital stock and these officers: President, Charles C. Camber; treasurer and clerk, Frank E. Ross. Mr. Ross was recently with the Manufacturing Equipment & Engineering Company, Boston, as its general manager.

The United Shoe Machinery Company, Boston, Mass., makes the announcement that it is to increase its capital stock by about $1,625,000, the new money to be devoted to a large addition to the plant at Beverly, Mass., now in progress of construction, and to large additions to the company's works in England, France and Germany, which it is proposed to build. The stock will be issued to the present stockholders at par, $25 a share, one share of the new stock for each 10 shares now held. The business of the company has grown so rapidly that the great works at Beverly, completed comparatively recently, have had to be very materially enlarged, and it is understood that the same situation prevails in the works abroad. It is presumed that the company must be a large buyer of machine tools and other equipment for the works in Europe. That for the Beverly works has already been decided upon, it is understood in the trade.

A new railroad corporation has been organized in Maine, known as the York & Oxford Railway Company, to build a line of standard gauge from the terminus of the Atlantic Shore Line Railway in Springvale to Bridgeton Junction, a total of 40 miles. The capital stock named is $160,000. It is stated that the road will be operated by electricity.

Cincinnati Machinery Market.

CINCINNATI, October 8, 1906.

The past two weeks have been productive of a large amount of new business, and machine tool builders generally are wondering where and when this activity is to stop. Trade with Continental Europe has developed wonderfully within the past six months, until it appears to be a matter of conjecture how to handle it and at the same time give proper attention to home consumption. As matters are at present most manufacturers are from six to eight months behind in deliveries, without taking into consideration the number of canceled orders for too great delay.

The Fox Reversible Gasoline Engine Company, Newport, Ky., has filed articles of incorporation. The incorporators are Dr. E. E. Schmidt, M. B. and A. G. Dean, John Schneider and Albert Berry. The company recently removed from Covington and has a capital stock of $100,000.

The new company will operate in connection with the Dean Engine Company and will build engines, motors, &c.

The Hamilton Mfg. Company, Hamilton, Ohio, with $10,000 capital stock, has been incorporated by L. D. Kohn, R. R. Andrews, W. F. Thaueald, R. S. Radcliff and W. J. Becker, to manufacture wood and metal specialties. It is the intention to erect a new plant near that of the Vulcan Foundry, with floor space of about 4500 sq. ft.

The addition to the Hayden-Corbett Chain Company's plant at Columbus, Ohio, is progressing rapidly, and will probably be completed early next month.

Caldwell & Drake, Columbus, Ind., are adding to their structural iron plant at that point a building to be used for electroplating purposes.

The Steel Foundry Company, Cincinnati, as predicted in these columns several weeks since, has increased its capital stock from $100,000 to $200,000 for the purpose of adding extensive improvements in buildings and machinery. The business of this plant has increased so rapidly since the first heat was drawn that present facilities have proved wholly inadequate to handle the work.

The Buckeye Foundry Company, located at Buck street and Queen City avenue, Cincinnati, is having plans drawn for a one-story fireproof building, 70 x 73 ft., to be used for cleaning purposes.

The Case Mfg. Company, Columbus, Ohio, is figuring on an addition to its crane erecting shop, 80 x 80 ft., making that department 180 x 240 ft. This expansion will cost about $10,000 and will be of concrete and steel construction. A heating plant will be added and a new 10-ton electric traveling crane.

Philadelphia Machinery Market.

PHILADELPHIA, PA., October 9, 1906.

More active conditions prevailed in the local machinery market the past week. While the bulk of the business placed was for single tools, several nice lots were closed by both manufacturers and dealers. Inquiries coming in are fully as numerous as for some time past. Deliveries, however, are in such poor shape that there is more or less delay in placing orders, but when the intending purchaser finds that the best possible delivery for the tool or tools desired has been obtained there is not much hesitation about placing the order. While price is on the whole the feature of a sale, it cannot always be said at this time that it is the principal factor. Delivery is just as important, and in some cases more so, and prospective purchasers are in many instances perfectly willing to pay advanced prices for delivery considerations. Sales during the week have covered the lines of medium sized tools pretty fully. Some business has been done in heavy tools, but the amount has been small. One of the local dealers closed a contract for 36 lathes, most of which were 14 in., for a Baltimore concern, and some fair business was transacted with the local traction company. Some of the new business placed is coming from the various railroads, but the amount is not large. Orders from the local roads are scattered, but those from the Southern roads are in somewhat better shape. Manufacturers are receiving orders the average total of which exceeds their productive capacity. Under such conditions, and with plants already behind their orders, there does not appear to be much chance for improved deliveries. The inability to obtain raw materials promptly has been somewhat of a drawback to many manufacturers, while with others the inability to get satisfactory labor has an unfavorable effect on high production.

The foreign demand appears to be improving. Inquiries for various classes of special tools and machinery are coming out quite freely. Some little demand for the standard lines of machine tools is reported, but manufacturers pay but little attention to this trade, owing to the large volume of domestic business. Orders for special machine tools for export are increasing and some of the tools bought are quite heavy. Those transacting a more or less regularly established trade abroad in the smaller specialties report a good volume of business coming in, fully up to if not slightly better than the amount usually transacted at this season.

If second-hand machinery merchants could supply promptly all the various tools and sizes being asked for they would be transacting a tremendous business. In some cases, however, second-hand tools are as scarce as new ones, and dealers find it hard to keep stocks up. But few second-hand tools of the heavy class are in stock, and the later types of so called standard makes of tools have been pretty well sold. Dealers are making every effort to keep their stocks of tools pretty full, but this in many instances is a difficult task.

The demand for engines and boilers shows some little improvement. Several good propositions for high power installations are before the trade and are expected to close at an early date. Sales of medium power equipment are somewhat better, although the demand cannot be said to be very active. Second-hand boilers and engines are not in very good demand. Sales have been made where delivery was imperative, but the general run of this business will bear considerable improvement.

The situation among the foundries is unchanged. Steel casting plants continue fully occupied, while many of the gray iron foundries have as much work offered as can be taken care of. Some manufacturers complain about their inability to get good deliveries of machinery castings, while others appear to have no difficulty in getting prompt deliveries.

The Eynon-Evans Mfg. Company has obtained possession of the three-story building at the southwest corner of Sydenham and Clearfield streets, opposite its works, and will move its office and drawing room there. This will enable the space now occupied for these purposes to be used for the extension of the machine shop, the equipment for which will include 10 turret lathes for general brass and bronze work for which the company is now in the market. This company is very busy in all departments. Orders are coming in freely, among which may be mentioned one for 30 8-in. balanced stop check valves for high pressure work for the new additions to the plant of the Bethlehem Steel Company. Orders have also been booked for two 14-in., two 17-in. and one 24-in. balanced free exhaust valves for New England customers, while those received for blowers and the general line of acid resisting bronze and brass castings have been extremely good.

The Board of Education, Philadelphia, A. F. Hammond, Superintendent of Supplies, room 297, City Hall, will receive until noon October 15 bids for a pattern makers' lathe and one screw cutting lathe and a water cooling apparatus for the Northeast Manual Training School. Specifications may be had at the office noted.

The Yacht, Gas Engine & Launch Company, Essington, Pa., has started work on the erection of a new machine shop. The building will be of steel, 75 x 115 ft. A number of lathes, a planer, radial drill and other machine tools for metal and wood working have already been purchased for the equipment of the plant. The company is in the market for a band sawing machine and a resaw outfit for its woodworking department.

The New York Shipbuilding Company, Camden, N. J., has been awarded by the Department of Commerce and Labor, Washington, D. C., a contract for four lightships for use along the coast. These vessels are 136 ft. over all, 30 ft. beam and 15½ ft. deep. All are of the same type, similar in construction to the five lightships which were built about a year ago for the Government by this company. It now has on its books a large volume of business, sufficient, it is said, to keep it actively engaged for a year or more ahead.

The American Pulley Company notes an increased demand from both foreign and domestic sources for its pressed steel pulleys. Every department is fully occupied, and the recently completed addition to the plant is now in full use. Shipments for export account have recently been quite heavy and include two carloads for shipment to Bombay, India, for the equipment of a textile mill in that country; also extensive shipments for delivery in Germany, Chile, Singapore, China, Japan and British Guinea. Domestic deliveries in carload lots have been made recently to Chicago, Portland, Ore., and several Southern points.

The E. H. Mumford Company, manufacturer of foundry molding machines, is very busy, the month of September having been the largest in point of orders received and shipments made since the company's formation. The demand covers pretty well the full range of molding machines, and orders for Rathbone multiple molding machines for light steel castings, jolt ramming machines and heavy power ramming split pattern machines for large railroad work have been in good number. One order for nine machines, which in addition to the vibrator attachment are equipped with a new combination hand starting and power draft mechanism, was received from an Eastern concern. Deliveries recently, in addition to a large number of machines of various types to foundries in different parts of the country, include two split pattern machines for export to Switzerland and a like number of a similar type of machine to England.

The Newton Machine Tool Works, Incorporated, continues very busy in all departments, the past month being the largest in point of orders received that the company has ever had. The demand from foreign as well as domestic sources has increased materially, and orders for heavy planing machines, rail drills, portable tools, such as slotting, milling and boring machines, a number of which are to be equipped with the Riddell pneumatic drive, and cold saw cutting off machines of various types have been received. To meet this heavy demand the Newton Works will gradually increase the capacity of its plant; a number of tools of its own design and built in the works will be added, while the purchase of a number of others in the open market is contemplated. Deliveries in September were heavy and included two spindle keyseating machines for export to Paris, Berlin and London, while domestic deliveries included the general line of tools to many of the large locomotive shops, electric works and railroad shops.

Cleveland Machinery Market.

CLEVELAND, OHIO. October 9, 1906.

The only objection machinery dealers can find with the trade at present is that deliveries appear to be growing worse instead of showing improvement. The demand is now heavier than at any previous time this year, but many orders are being lost because people cannot wait for the goods. They are satisfied to get odd tools that are not just what they want or second-hand machines where they are up to date and in good condition. A general advance, averaging about 5 per cent., was announced on lathes, planers and other tools the first of the month, but there is no abatement in the demand. Automobile manufacturers are now well under way on next season's products and are buying whatever tools they can secure on quick delivery, to take care of a greater demand for vehicles than was apparent a few weeks back.

The F. B. Stearns Automobile Company will increase its output about 75 per cent. for next season, and has been buying a number of large tools from local dealers and manufacturers.

The White Sewing Machine Company is making preparations to get into its enormous new plant within the next few weeks and within the past week or two has ordered a number of tools, in addition to those ordered two or three months ago.

The Winton Motor Carriage Company is now installing machinery in its large additions, which increases its capacity nearly 50 per cent. over the output of this year.

The American Ball Bearing Company, manufacturer of ball bearings and automobile parts, is preparing to manufacture its own balls and has purchased the ball making machinery of the Baker-Resik Company of this city for a nucleus. It will install additional machinery of this character, and a little later will commence the manufacture of steel balls for the trade.

The Pattison Machinery Company of this city has purchased the entire equipment of forging machinery, lathes, planers, grinders and other tools of the Blakeslee Forging & Mfg. Company and will dispose of the tools individually.

The Cleveland Punch & Shear Works Company has commenced work on a new building, 40 x 160 ft. and three stories high. It will be utilized for the punch and die department. Considerable new machinery, including a number of automatics, is being installed.

The Ohio Electric Supply Company, Columbus, has purchased a shop formerly occupied by the Morgan Engineering Company at Alliance, Ohio, and will remodel it and equip it with machinery to build electric motors. The statement published in the daily papers that motors were to be built in this shop led to the report that the Morgan Engineering Company was about to engage in the production of motors, but this is denied by officials of that company. Otto C. Rayman is at the head of the new company.

The Bascomb Boat Company, Bascomb, Ohio, has closed a deal with business men of Port Clinton, Ohio, whereby the plant will be removed to that city. A new factory will be built immediately. The company manufactures gasoline motor launches.

The Mt. Vernon Bridge Company, Mt. Vernon, Ohio, has made plans for an 80-ft. addition to its main building and will probably build this winter. The company's business has grown rapidly during the past year and it now employs about 200 men.

The Pittsburgh Valve & Fittings Company is at work on a large malleable iron foundry adjoining its new plant at Barberton, Ohio. The furnaces are now being installed, and it is expected that the plant will be ready for occupancy about December 1.

The Electric Controller & Supply Company, Cleveland, Ohio, announces the opening of a branch office in the Merchants' Loan & Trust Building, 135 Adams street, Chicago, with W. M. Connelly in charge. Mr. Connelly was connected with the electrical department of the Homestead works of the Carnegie Steel Company for five years, and resigned his position there to become electrical engineer of the Ensley plant of the Tennessee Coal, Iron & Railroad Company at Birmingham, Ala., which position he held for three years, and resigned to enter central station work at Birmingham, Ala., and at Houston, Texas, where he organized and had charge of the sales department.

The Patterson Tool & Supply Company, Dayton Ohio, has opened a branch at 508 East Twenty-third street, Indianapolis, Ind., in charge of A. G. Schonaker, from which location the company will be able to take excellent care of its Indianapolis customers for machine tools and supplies.

The Bristol Company, Waterbury, Conn. manufacturer of recording instruments, steel belt lacing, &c., has established a branch office at 750 Monadnock Building, Chicago, Ill.

Government Purchases.

WASHINGTON, D. C., October 9, 1906.

The Isthmian Canal Commission will receive bids until October 23, Circular No. 334, for drill grinder, pillar crank shapers, bending rolls, flanging clamp, saw machine, &c.

The Isthmian Canal Commission will receive bids until October 16 for earth spreaders, unloader plows and other supplies.

Calvin H. Asbury, superintendent of the Indian School, Carson, Nev., is asking bids for one 15-hp. boiler and other supplies.

The Bureau of Yards and Docks will receive bids until October 13 for boilers, coal handling apparatus, electrical equipment, pumps and other supplies for the navy yard at Charleston, S. C.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until November 13 for three electric traveling cranes for the Mare Island Navy Yard.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until November 3 for pumping machinery and accessories for dry dock No. 3 at the Norfolk Navy Yard.

The following bids were opened October 2 for supplies for the navy yards:

Bidder 22, Brooklyn Forge & Supply Company, New York; 41, Camden Iron Works, Camden, N. J.; 48, Drew Machinery Agency, Manchester, N. H.; 51, Dunham, Carrigan & Hayden Company, New York; 92, Handlan-Buck Mfg. Company, St. Louis, Mo.; 126, Manning, Maxwell & Moore, New York; 155, J. W. Paxson Company, Philadelphia, Pa.; 167, Ricketts Engineering Company, Washington, D. C.; 173, H. A. Rogers Company, New York; 182, J. B. Roache, Brooklyn, N. Y.; 231, Henry R. Worthington, New York; 238, Berry & Aikens, Philadelphia, Pa.

Class 33. One tumbling barrel—Bidder 155, $400.

Class 34. Two double piston outside pump hydraulic jacks—Bidder 22, $378.80; 41, $380; 48, $459; 51, $393.20; 92, $412; 126, $419.40; 173, $390; 182, $572.40.

Class 246. One Worthington underwriters' fire pump—Bidder 167, $725; 231, $565; 238, $674.

The following bids were opened October 2 for machinery for the Isthmian Canal Commission, Circular No. 330:

Bidder 33, Manning, Maxwell & Moore, New York; 38, Motley-Green & Co., New York; 46, Prentiss Tool & Supply Company, New York; 49, Queen City Supply Company, Cincinnati, Ohio; 51, Ricketts Engineering Company, Washington, D. C.; 60, Stauffer-Eshleman Company, New Orleans, La.; 74, Fox Brothers Company, New York.

Class 10. One horizontal drill press—Bidder 33, $2195.23, 90 days; 46, $1065, 165 days.

Class 11. Three upright drill presses—Bidder 33, $263.25, 240 days; 38, $285, 120 days; 46, $315, 65 days; 49, $277.50, 60 days; 51, $336, 60 days; 60, $360, 10 days; 74, $291, 85 days.

Class 12. Three stationary head upright drill presses—Bidder 33, $532.05, 110 days; 38, $550.50, 90 days; 46, $540, 105 days; 49, $528, 60 days; 51, $693, 60 days; 60, $675, no time; 74, $495, 85 days.

Class 13. Three sliding head upright drill presses—Bidder 33, $1099.74, 110 days; 38, $1095, 90 days; 46, $1260, 75 days; 49, $1042.50, 60 days; 51, $1359, 60 days; 60, $1050, 10 days; 74, $1005, 110 days.

Class 14. One heavy pattern upright drill press—Bidder 33, $612.80, 150 days; 38, $598.50, 120 days; 46, $855, 125 days; 49, $570, 60 days; 51, $741, 90 days; 60, $540, 10 days; 74 $455, no time.

The following are the bids opened October 3 for a coaling plant at California City, Cal., and at Guantanamo, Cuba:

California City.

Hoshor-Platt Company, New York, $87,893; for geared engines, $86,705; if tubular boilers are used, $190,000.

Snare & Triest Company, New York, $149,300, $17,000, $122,900; deduct $9700, deduct $22,000; these figures according to bidder's own specifications.

Occidental Machinery & Engineering Company, San Francisco, Cal., $275,000; $4000 for each shed; $250,000 if steel wharf and trestle are required.

Guantanamo.

Hoshor-Platt Company, New York, $67,984; $66,810 if geared engines are used; $66,605 if geared engines and tubular boilers are used; $65,110 for one engine and two trolleys.

Wellman-Seaver-Morgan Company, Cleveland, Ohio, $131,240.

Robins Conveying Belt Company, New York, $68,925 and $67,800.

Wm. L. Miller, Boston, Mass., $47,900; $44,000 if two bridges are required.

Dodge Cold Storage Company, Philadelphia, Pa., $242,955 and $66,790; $55,245 for additional tramway.

Snare & Triest Company, New York, $67,600, $67,600 and $58,000.

Scofield Company, Philadelphia, Pa., bid A, $69,810; bid B, $58,960.

The following awards have been made for pneumatic tools for the Isthmian Canal Commission, bids for which were opened September 4, Circular No. 324:

Chicago Pneumatic Tool Company, New York, class 6, 36 Little Giant nonreversing drills, $2790.60.

Cleveland Pneumatic Tool Company, Cleveland, Ohio, class 2, six holder-ons, with repair parts, $157.15; class 3, six breast drills, with repair parts, $267.49; class 5, three Little Giant reversible drills, $358.46.

Under bids opened September 18 for supplies for the navy yards M. T. Davidson, Brooklyn, N. Y., has been awarded class 280, two steam pumps, $95.

Under bids opened September 25 for machinery for the navy yards the Babcock & Wilcox Company, New York, has been awarded class 141, five water tube boilers, $39.511.

Labor Notes.

The annual report of the International Association of Machinists for the year ending June 30, 1906, from which data are published in the *Machinists' Monthly Journal*, shows that strikes were called in the year against 28 individual concerns, as well as in all the contract shops in Lynn, Mass.; Indianapolis, Ind., and Williamsport, Pa. Agreements were made with 32 firms and with 47 railroads. In the year 38 new general lodges and 10 specialists' lodges were organized and 26 lodges disbanded. The total paid in strike benefits was $143,069.58, and in death benefits, $29,375. Negotiations with the Amalgamated Society of Engineers in Great Britain were conducted by a representative of the Machinists' Union from Calgary, Canada, who was sent abroad on this mission. The International Association of Machinists asks the British union to concede to it trade jurisdiction over members of the Amalgamated Society of Engineers in North America. While the effort has not been successful as yet the International Society of Machinists expects that in time such an arrangement will be made.

The United Shipwrights' Association, whose members in New York City and Brooklyn went on strike October 1 to enforce a $4 wage and a half holiday on Saturday the year round, has requested a conference with the New York and New Jersey branch of the National Metal Trades Association. The union withdraws the demand for a half holiday and is willing to accept $3.75 a day instead of $4.

The foundry owners of Madison County, Ind., at a meeting in Anderson, effected an organization for mutual help in maintaining open shops, for which they recently declared when the employees struck for higher wages and shorter hours. The foundries represented are: The Wooley Foundry & Machine Works, the Hill Machine Company, the Anderson Foundry & Machine Works, the Ross Supply Company, all of Anderson, and the Elwood Iron Works of Elwood. W. J. Wooley, Anderson, was elected president; F. J. Hill, vice-president, and M. J. Fogarty, superintendent of the Elwood Iron Works, secretary-treasurer. "To pay a well qualified man every dollar he is worth, though it be $10 a day, and to discountenance incompetents, even if they have a union card," is the attitude of the organization as expressed by the secretary. The foundries interested are all running full force.

An agreement was reached October 5, by mutual concessions, between the Molders' Union and the foundry operators at Youngstown, Ohio, and the strike which has been in existence for about six weeks was declared off. Under the new agreement the molders will receive $3.20 per day instead of $3, as formerly, and the coremakers will receive $3 a day instead of $2.75 as before. Immediately after the agreement was made, the most important foundries in the Youngstown, Ohio, district signed the scale, among these being the William Tod Company, Lloyd-Booth Department of the United Engineering & Foundry Company, Youngstown Engineering Company, Mahoning Foundry & Machine Company, Falcon Bronze Company, the Youngstown Bronze Company and the foundry department of the Youngstown Foundry & Machine Company. The men returned to work October 8.

PERSONAL.

A. W. Slocum, formerly general superintendent of the National Car Wheel Company, Pittsburgh, has become superintendent of the Dickson Car Wheel Company, which is now erecting an extensive car wheel foundry at Houston, Texas. It is the intention to make the new plant one of the best equipped in the country.

M. Koyemann, Duesseldorf, Germany, the well-known importer of American machinery, is now in this country, but expects to return next week. He has visited the principal works in the Central West and in New England. He urges American builders of machine tools to be more careful in patenting their inventions in Germany.

Robert H. Hammond has recently resigned the position of master mechanic of the Duquesne Steel Works and blast furnaces of the Carnegie Steel Company at Duquesne, Pa., to accept the position of general master mechanic of the Bethlehem Steel Company, South Bethlehem, Pa.

Harvey M. Wolfe, for some years connected with the Pittsburgh office of *The Iron Age*, has resigned to enter the firm of E. M. Doyle & Co., manufacturers' agents, Fulton Building, Pittsburgh. He has been succeeded by Herman C. H. Weidner, recently connected with *The Index*, a weekly publication in Pittsburgh.

H. H. Graham, formerly night superintendent of the 48-in. mill at the Homestead Works of the Carnegie Steel Company, has resigned and will engage in other business.

H. S. Brown, New England sales manager of the Power Specialty Company, with offices at 10 Post Office square, Boston, sailed this week for a short stay in Europe, to return about November 10.

Frank Engelhardt, formerly sales agent for the Filer & Stowell Company, Milwaukee, has been appointed representative of the Wisconsin Engine Company, Corliss, Wis., and will occupy offices at 735 Marquette Building, Chicago.

Charles A. Moore, Jr., secretary of Manning, Maxwell & Moore, Incorporated, New York, has returned from a trip to Arabia, where he and two others went to purchase Arabian thoroughbreds.

Heavy Purchases for Steel Corporation Mines.

The Oliver Iron Mining Company is making extensive purchases of material for mine operation the coming year, especially for the western Mesaba operations into which it is now going so extensively. These purchases include 22 steam shovels of about 90 tons weight, 30 locomotives and several hundred patent self-dumping standard gauge stripping cars. A large amount of new machinery for underground mines, in the way of hoists, compressors, pumping engines, &c., will be purchased as needed. The work of the company for the coming year will be very largely directed to opening and enlarging already open stripping mines on the Mesaba and to developing the new fields in the western end of that district. Coleraine, Bovey and Holman mines, as well as others about 6 miles east of there, will be extensively stripped, and large operations will be carried on at Virginia in the Oliver and Ohio group, as well as at the new Gilbert mine near Sparta. The sinking of deep foot wall shafts, steel lined and extensively equipped, on old ranges, will be continued where necessary and in preparation for very large and economical mine operations whenever needed.

The two sections of the second tube of the Pennsylvania tunnel under the North River were joined Tuesday and for the first time in history a party of men walked from New York to Weehawken, N. J., and back by a different route.

Trade Publications.

Motors.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 66. Describes and illustrates the form W motors for rolling mills, which range in capacity from 25 to 100 hp. These motors are entirely enclosed and being insulated with asbestos are rendered fireproof so that they can be operated in the hottest places. Dimensions of the motor are given. An illustrated description of these motors appeared in *The Iron Age*, July 19, 1906.

Air Purifier.—Buffalo Forge Company, Buffalo, N. Y. Catalogue No. 97. Size, 6x9 in.; pages 36. Deals with the Buffalo air washer and humidifier, claimed to be the most modern system for the warming and ventilating of public buildings, offices, libraries, etc. Descriptive matter and illustrations explain the operation of the apparatus.

Electrical Apparatus.—The Cutler-Hammer Mfg. Company, Milwaukee, Wis. Loose leafs for insertion in binder. These are numbered 10 G-3, 13, 17, 32 C, 59, 59 A, 59 C, 59 G, 70 C-1, 70 C-3, 92 and 92 A-1. Each of these supersede a page of the same number, and deal with motor starters, field regulators, controllers, dimmers, and in general the various kinds of electrical controlling apparatus made by the company.

Machinery and Supplies. — The Quincy, Manchester, Sargent Company, Plainfield, N. J. Loose leaf catalogue. Size, 6x9 in.; flexible leather binding. This company, operating the Railway Appliances Company, Q. & C. Company and Pedrick & Ayer Company and also acting as sole sales agent for the Elastic Nut & Bolt Company, has adopted the modern idea of a loose leaf catalogue which may be kept up to date by inserting new leaves from time to time in place of, or in addition to those previously issued. The catalogue is subdivided by classification leaves giving the following general headings: Q. & C. metal sawing machines, Q. & C. portable rail saws and power hack saws, Pedrick and Ayer portable tools for the repair shop, pneumatic cranes and hoists, riveting machinery and railway supplies. An alphabetical index in the fore part of the book locates instantly any article which may be sought through the some 200 or more pages which the catalogue at present contains. In the make-up of the catalogue the commendable practice has been followed of illustrating the subject on one side of the sheet and giving its description on the back instead of on an opposite page. The usefulness of this scheme is apparent as if it is desirable to remove a leaf it takes with it only the matter pertaining to the one subject.

Tool Steel.—Firth-Sterling Steel Company, E. S. Jackman, agent, 53 North Desplaines street, Chicago, Ill. Pamphlet describes and lists the line of Blue Chip brand of high speed steel, made in bar and disk form, and points out the advantages attending its use. The bar stock is intended for the making of lathe, planer and similar tools, and the desks for milling cutters of all kinds. Useful directions for the handling of the steel are given. Other grades of steel made by the company are briefly referred to and tables of weights are appended.

Planers.—Batemans' Machine Tool Company, Ltd., Balm road, Hunslet, Leeds, Eng. Catalogue. Size, 7 x 8¾ in.; pages 25. Refers to the capabilities and manufacture of Bateman's high speed planers, which have a cutting speed of from 20 to 80 ft. per min. A general description of the features of the planer is given, and details concerning the various attachments together with useful information in connection with planer work. Numerous illustrations show several sizes of these machines and special operations.

Engines.—Reeves Engine Company, Trenton, N. J. Catalogue, circulars and instruction book. The catalogue deals particularly with the Reeves compound engines of the vertical and horizontal, belted and direct-connected types. The cylinders and valve action of the compound engines are explained, and also the Reeves patented adjustable piston valves. Some information is given concerning the Reeves automatic single cylinder engine, designed for power and electrical purposes. Tables of dimensions and horse-powers of both types of engines are appended. Two of the circulars treat of interesting tests of a Reeves vertical, cross-compound, and a Reeves simple engine made at Sibley College, Cornell University, Ithaca, N. Y. The third circular deals with improvements in the cylinder construction of the Reeves compound engines. The instruction book gives directions for setting up and operating Reeves automatic engines, and is also useful as a reference book to the engineer.

Prism Binoculars. — The Warner & Swasey Company, Cleveland, Ohio. Pamphlet. Subject, "Reflections of a Rambler." By Elmore Elliott Peake, which describes the various pleasures one may enjoy by the aid of a prism binocular, or a still more powerful instrument, the prism terrestrial telescope.

Spindle Carver.—West Michigan Machine & Tool Company, 6 Lyon street, Grand Rapids, Mich. Circular. This electrical spindle carver is claimed to be a time saver, quick and simple in its adjustments, easily operated, and does away with shafting, pulleys and belting, and consequently vibration. A price list of carving machine cutters, rounding and rosette cutters is given.

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HARDWARE

THE statistics given in our Washington letter in this issue will be regarded with interest as indicating, if they do not at all fully exhibit, the increase in the production of Hardware during the past five years. In studying these tabulations it must be remembered that the term Hardware is used by the Census Bureau in a much narrower sense than is customary in the trade. This is seen in the fact that the very important departments of manufacture included under the terms of Cutlery, Edge Tools, Files and Saws, are treated separately and do not come under review in the statistics relating to Hardware in its restricted signification. In a scrutiny of the figures given it is important to bear in mind that the manufactured articles which are included in the Census classification of Hardware are the following and similar products in the metal line: Locks, Padlocks, Door Hangers, Hinges, Casters, Hooks and Staples and Clasps, Piano and Organ Hardware, Carriage Hardware, Nut Crackers, Curling Irons, Can Openers, Skates, Stair Rods, Sash Weights, Transom Lifters, Curry Combs, Animal Traps, &c., not, however, including Saddlery Hardware, for which there is a special classification, nor such important lines as Nails, Bolts, Nuts, Agricultural Tools and Implements which come in under other heads.

The small number of establishments which is covered by the Census report is further explained by the fact, which our correspondent mentions, that no establishment is classified in the Hardware schedule unless more than 50 per cent. of its product belongs in the class of goods embraced within the Census Bureau's category for Hardware, the scope of which we have just referred to. Thus a great many manufacturers who make goods which are unquestionably Hardware are not counted as Hardware manufacturers, inasmuch as the major part of their product falls under another classification. This is undoubtedly the case with some of the great producers of Wire Nails, for example, whose preponderating product causes them to be classified under another schedule. The official figures which we are permitted to give relating to the production and growth of Hardware in the governmental sense are not therefore to be taken as covering at all completely Hardware production in the sense in which the term is used in the trade. Instead indeed of the 445 concerns referred to in the statistics in question as Hardware manufacturers there is no doubt that the establishments, large and small, manufacturing classes of goods which are represented in Hardware stores aggregate many thousands. The figures, however, are significant so far as they go as indicating the progress made during the five years under review and certain changes which have taken place geographically in the production of certain classes of Hardware.

Condition of Trade.

If there is a disposition anywhere to complain of the current volume of business it is because the demand is too insistent and large to be met with promptness and comfort. Manufacturers are certainly experiencing the inconvenience which attends calls from their customers which they are unable to answer satisfactorily either to themselves or to the merchants who are belaboring them for goods. Connected with this large volume of business is the difficulty of transportation, and the annoyance and expensive delays in the receipt of raw material by the manufacturers and of the finished products by their customers. Congestion on both Eastern and Western railroads is becoming so serious that a car blockage is feared. It is indeed reported that some of the railroads may be compelled to refuse additional freight for shipment until they have opportunity, at least partially, to clear their tracks. One of the large Eastern systems is said to be simply swamped with orders for cars, which cannot be furnished. Shippers of all kinds certainly find it increasingly difficult to get the cars that they require. Much trouble is thus caused all along the line and both manufacturers and merchants are called upon to suffer. With the market decidedly strong in the matter of prices and advances constantly taking place there is little disposition on the part of buyers to endeavor to obtain concessions from sellers. They rather count themselves fortunate if they are able to get the goods in any reasonable time. With the existing conditions in transportation it becomes also the part of wisdom for merchants to anticipate requirements and have the goods in stock, so that they may be in readiness for delivery when called for.

Chicago.

Western jobbers and distributers almost unanimously report a greater volume of trade in September than during the same month a year ago. This record is all the more phenomenal owing to the heavy buying in August, when retailers placed the bulk of their orders for Wire products, while last year this movement was deferred and did not reach its hight until the middle of September. Thus far the present month is maintaining a record that compares favorably with the same period in September, although it is doubtful if this activity will prevail throughout the month. Heavy filling-in orders for Stoves are being received from the Northwest, while in other sections retailers report sales of large volume. A solution of the Wire Cloth problem is anticipated at an early date, and prices for the ensuing season will probably be on a higher basis than has prevailed this year. No further efforts are being made to bring about a consolidation of the leading Wire Cloth plants, owing to the refusal of some of the makers to give options on their properties. A price agreement will, however, be made if negotiations now under way reach a successful conclusion, and if the plan already outlined is adopted there will be no shading of prices, regardless of the size or desirability of the order. It has been hinted that the old basis of $1 to $1.10 may be re-established, but nothing definite concerning the schedule is yet available. In the heavier Hardware lines producers are constantly falling further behind in the matter of deliveries and there is little indication of improved shipments before the first of the year. On iron bars store prices have been advanced to 2.25 cents by the local jobbers of Heavy Hardware and iron and steel distributers and another dollar has been added to the premiums that are being asked on Black and Galvanized Sheets from warehouse. Every effort is being made by the Wire manufacturers to meet the insistent demands for quick shipment, as the stocks of Nails, Fencing and Barbed Wire in the hands of jobbers and retailers are very low.

NOTES ON PRICES.

Wire Nails.—While large buyers covered their requirements previous to the last advance in prices, new business continues heavy. Shortage of Steel and of cars interferes materially with output and prompt shipments, and mills are getting behind on deliveries. Prices for Nails are well maintained on the official basis, and it is understood that some of the smaller independent mills, who buy their raw material, are asking a premium above official figures. Quotations are as follows, f.o.b. Pitts-

burgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.85
Carload lots to retail merchants	1.90

New York.—Local demand varies with jobbers, some reporting a comparatively light business, while others are called upon to respond to an active demand which they find it difficult promptly to meet. A very general quotation on small lots at store is on the basis of $2.05 per keg.

Chicago.—Since the enforcement of official prices new tonnage has fallen off to some extent, although the lateness of the season is also a contributing factor in the decline in the demand. So far as the fall trade is concerned practically all of the large jobbers covered their requirements at lower prices than are now prevailing. Stocks generally are low and Mill shipments are still several weeks behind requirements. For prompt delivery of assorted sizes some of the independent makers are securing premiums of $1 a ton. During the month of September the American Steel & Wire Company exceeded all previous shipping records and with increased production this month this total will undoubtedly be surpassed. Official quotations, which are being firmly maintained, are as follows: $2 in car lots to jobbers and $2.05 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—We note a continued heavy demand for Wire Nails, in spite of the fact that most of the large trade covered its requirements for some time ahead prior to the recent advance in prices. The mills are still handicapped by shortage in supply of Steel, which keeps down output very materially, and also by shortage in cars, which seems to be getting worse. These two adverse conditions operate against the mills in catching up on deliveries on which they are somewhat behind. The tone of the market is very strong, and it is stated that some of the smaller independent mills that are dependent on the open market for Rods and Billets are asking a slight premium over official prices. We quote: Wire Nails, $1.85 in carloads to the large jobbing trade, and $1.90 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days. The above prices are now absolute minimum of the market.

Cut Nails.—Shortage of steel and difficulty in getting shipments from mills, on account of heavy specifications on contract orders and the scarcity of cars, keeps stocks in the hands of jobbers and retail merchants poorly assorted. Demand is so urgent that in some cases mills cut up orders and make carload shipments of such sizes as they can, which perhaps do not include sizes most in demand. The market is firm, and some mills are understood as asking 5 cents premium above official quotations. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $1.90; less than carloads, to jobbers, $1.95; less than carloads, to retailers, $2.05. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 and 10 cents advance on Steel Cut Nails.

New York.—Some improvement is noticed in the assortment of jobbers' stocks, although some carloads of Nails received from manufacturers are short of sizes ordered. This of course is annoying to the jobber, especially when they are sizes most called for. A very general quotation on small lots at store is on the basis of $2.05 per keg. Competition is largely responsible for this price, which is the same as for less than carloads to the retail trade, f.o.b. Pittsburgh.

Chicago.—Conditions remain practically the same, with jobbers' stocks considerably depleted as a result of inability to get shipments from the mills. Demand is heavy and October promises to show large totals in the volume of orders booked. Quotations prevail as follows: Steel Cut Nails, in car lots, $1.95 to $2; less than car lots, $2.05; Iron Cut Nails, $2.05 to $2.10, in car lots; less than car lots, $2.15.

Pittsburgh.—The mills making Cut Nails are behind in deliveries, owing to shortage in supply of steel and to the heavy specifications on contracts, which are coming forward very freely. Prices are very firm, and we understand one or two mills in the Wheeling District are quoting Nails on the basis of $1.95, at mill, which is an advance of 5 cents over official prices. The market is very firm, and we quote as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $1.90; less than carloads, to jobbers, $1.95; less than carloads, to retailers, $2.05. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 and 10 cents advance on Steel Cut Nails.

Barb Wire.—On account of the shortage of Steel and heavy specifications on contract orders, mills are not accumulating stocks and are behind on deliveries. Shortage of cars to deliver raw material to mills and the finished product to customers is causing annoyance to both sellers and buyers. Prices are being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.00	$2.30
Retailers, carload lots	2.05	2.35
Retailers, less than carload lots	2.15	2.45

Chicago.—Notwithstanding the fact that the season's consumption has been heavy, no stocks are accumulating at the mills. The movement of Barb Wire since early in August has already equaled that of the early spring months of this year, and the demand is now just beginning to show a slight decline. Prices, which are firmly maintained, are as follows: To jobbers, Chicago, car lots, Painted, $2.15; Galvanized, $2.45; to retailers, car lots, Painted, $2.20; Galvanized, $2.50; retailers, less than car lots, Painted, $2.30; Galvanized, $2.60; Staples, Bright, in car lots, $2.10; Galvanized, $2.40; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New business coming in is rather light, as the large trade placed heavy contracts some time ago, and is now specifying very freely on these orders. The mills have practically no stocks, and are from two to three weeks behind in shipments. The continued shortage in supply of Steel and the shortage in cars are operating against the mills in getting out output and in making deliveries. Prices are firmly maintained as follows: Painted Barb Wire, $2, and Galvanized, $2.30, in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Similar conditions existing in connection with the Nail and Barb Wire market affect the distribution of Smooth Fence Wire, and mills are from two to four weeks behind on deliveries. The market is strong and prices firm. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—On all grades of Smooth Wire the mills are from two to three weeks behind in their deliveries, although the increased production expected this month will undoubtedly relieve the pressure on the mills. Specifications are heavy, especially from the manufacturing trade. Quotations are firmly maintained, as follows: Jobbers, $1.85, f.o.b. Chicago, in car lots; retailers, $1.90.

Pittsburgh.—On account of the very heavy buying movement prior to the recent advance in prices, new tonnage being received by the mills is light, but specifications on contracts are coming forward very freely and the mills are three to four weeks behind in deliveries. We understand that some heavy contracts have been placed for deliveries as far ahead as next year, and the mills are handicapped in operation by shortage in Steel and trouble in getting cars promptly. Prices are very firm and are being rigidly adhered to by the mills. Quo-

tations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.70
Retailers, carloads	1.75

The above prices are for base numbers, 6 to 9.

Jack Screws.—An advance of 10 per cent. has recently been made in the price of Jack Screws. The market to fair retail trade is now represented in a general way by a discount of about 75 per cent.

Shelf Brackets.—Leading makers of Steel Shelf Brackets have made a slight advance in their prices to the jobbing trade. The present level of the market for retail merchants may be represented by a quotation of 80 to 80 and 5 per cent. discount, although lower prices are frequently made by the jobbers who have goods on hand purchased at lower prices.

Rubber Belting, Packing and Hose.—Manufacturers of Rubber Belting, Packing and Hose are booking an increased business for the coming year and there seems to be a general call for a higher quality of material on the average than ever before. Works are being taxed to their utmost capacity, but the complaint is made that the shortened supply of cotton duck has restricted business to some extent. The price of this commodity, which enters very largely into the manufacture of these lines, has advanced nearly 20 per cent. within a year, and in two years almost twice that amount. Crude rubber, already on a high level, is showing an advancing tendency, due to the shortness of the supply and the constantly increasing variety of uses to which rubber goods are being applied. Some manufacturers are withdrawing quotations explaining that they must either institute advances or alter the quality of their brands. It is to the credit of producers, however, and fortunate for the trade and the consuming public, that the latter alternative is generally regarded in its proper light as a damaging and short sighted policy.

Coat, Hat and Ceiling Hooks.—An advance of 5 per cent. was recently made by most manufacturers of Wire Coat, Hat and Ceiling Hooks. The regular discount to the retail trade is now 75 and 10 per cent, although it is possible that jobbers who are well stocked with goods purchased before the advance will temporarily make slight concessions on this price.

Brass Cocks.—Quotations on both Hardware and Plumbers' grades of Brass Cocks are showing an advancing tendency in sympathy with the remarkable conditions prevailing in the market for raw material. Nearly all the manufacturers have stiffened up their prices within two or three weeks, changes ranging from 2½ to 10 per cent., according to the character of the buyers and the size of the orders.

Tacks.—A stiffening tendency is observed in the market for Tacks. Some manufacturers have made quotable advances in their prices, while others are refusing concessions which were allowed a short time ago. The increasing cost of copper has naturally affected the prices of all lines into which it enters.

Copper Products.—The Copper market still shows a tendency to advance, affecting all products composed wholly or in part of Copper, the most sensitive articles being Copper Sheets, Wire, Rods, Soldering Coppers, etc., which record important increases, in harmony with the higher rates for Ingot Copper. The leading manufacturers of these important commodities, realizing the impossibility of maintaining fixed prices, have notified the trade of the withdrawal of prices, which are for the present being quoted from day to day, according to the market, on specification. Other advances are freely predicted by well informed manufacturers and merchants. Sheet Copper is 25 cents per lb. base, Copper wire 1½ cents higher and held at 23½ cents base, Copper Rolls and Rods 1½ cents per lb. advance, Soldering Coppers 1 cent advance, being quoted at 25 cents base on lots of 300 lb. and over; smaller quantities taking the usual advance with the customary differential on the smaller sizes. Advances are also expected in the immediate future on various lines of brass goods.

Rope.—Demand continues excellent, though manufacturers could take care of more business. Thus far in the present month orders compare favorably with those of September, in number and size. New York quotations on Rope are as follows: Pure Manila, 12¼ to 12½ cents; B quality, 11½ cents; Pure Sisal, 9 cents; No. 2 quality, 7½ to 7¾ cents; No. 1 Jute, ¼ in. and up, 8 to 8¼ cents; No. 2 Jute, 7½ to 7¾ cents per pound.

Window Glass.—At the meeting of Window Glass manufacturers, held last week, there was a representation of 2247 hand operating pots more, it is understood, than ever before gathered in the country. The impression appeared to prevail that some action should be taken to secure makers abainst loss and to insure a profit on the fire of 1906-1907. It is reported that manufacturers representing 1842 pots signed a provisional contract providing for the distribution of the present fires output, through a sales agency, before the session adjourned. Another meeting is scheduled to be held this week. The production of Glass has not been very largely increased by the starting of additional factories during the week under review. It is understood that many manufacturers who have fires in have signified a willingness to delay resumption until November 1, if a healthy market condition can be secured by so doing. It is pretty generally regarded as a fact that the producing capacity of American Window Glass is larger than is required to supply the demands of the country; also that since early summer Glass has been distributed by the makers with very little, if any, profit to themselves. It would seem wise that the manufacturers should take some action to improve conditions. Jobbers' quotations, from jobbers' list, October 1, 1903, are as follows: Greater New York, single, 90 and 5; double, 90 and 10 per cent. discount. Eastern District, except the Boston District, 90 and 10 per cent. discount for all sizes of single and double strength. In the Boston District quotations are reported as being 90 and 15 for all sizes of single and double strength.

Linseed Oil.—Market conditions represent a waiting policy on the part of buyers for lower prices, while the crushers feel justified in maintaining present quotations on the basis of a slightly advancing and well sustained seed market. Current business covers only immediate necessities, while there is little placing of contract orders. New York quotations are as follows, according to quality and seller: City Raw, 38 to 39 cents per gallon. Out of town Raw. 37 to 38 cents per gallon. Boiled Oil is 1 to 2 cents per gallon over Raw.

Spirits Turpentine.—Turpentine has advanced at this point about 3 cents per gallon during the week under review, in sympathy with an upward Southern market. Among the reasons given for the advances is the damage done by the recent storms in the Turpentine belt, ruined stocks on the farms, interrupted railroad traffic and shortage of cars, inability to move stocks to market centers and scarcity of labor. The successive advances in price stimulated buying at this point and at Savannah. New York quotations are as follows, according to quantity: Oil Barrels, 67½ to 68 cents; Machine Made Barrels, 68 to 68½ cents per gallon.

UNITED STATES HANDLE COMPANY.

THE UNITED STATES HANDLE COMPANY, Piqua, Ohio, has just issued an illustrated catalogue devoted entirely to Farming Tool Handles. Every endeavor has been made to make it exceptionally complete, with illustrations and lists of all kinds of wood Handles for the garden, farm and general use. The company is offering the product of 25 factories, including Piqua Handle & Mfg. Company, Columbus Handle & Tool Company, National Handle Company and other well known concerns in this line.

THE ILION CITIZEN of Ilion, N. Y., has issued a special illustrated edition, in which the manufacturing and mercantile interests of the town are attractively featured. The principal part of the paper is, of course, devoted to the great plants of the Remington Arms Company and of Wyckoff, Seamans & Benedict, manufacturers of the Remington Typewriter.

THE ART OF DECORATING SHOW WINDOWS AND INTERIORS.

"THE Art of Decorating Show Windows and Interiors" is the title of a substantially bound book of over 400 pages published by the Merchants' Record Company, Chicago. It is described on the title page as "a complete manual of window trimming, designed as an educator in all the details of the art according to the best accepted methods and treating fully every important subject." There are more than 600 drawings and half-tone illustrations, with photographic reproductions of handsome displays, all printed on good paper, with complete table of contents in the front and topical index in the back. A considerable section is devoted to frames and fixtures, especially of the adjustable kind, as well as to mechanical and electrical devices which are of importance to all lines of business. Although the main interest of the book is in the lines carried and the facilities required by department stores, it also contains some matter and a few illustrations of direct interest to the Hardware trade. In addition Hardware merchants will find that they can adapt to their own use many of the ideas conveyed in displays of other lines of merchandise. The book is offered at $3.50 per copy, charges prepaid.

TRADE ITEMS.

HENRY C. SQUIRES & SON, for nearly 15 years located at 20 Cortlandt street, New York, have moved to No. 44, on block below and next to the new North River tunnel terminal now being erected. The house has taken the entire building and will occupy the larger portion of it in connection with the carrying on of their business in Guns, Ammunition, Fishing Tackle, Pleasure Boats, Canoes, Cutlery, Kodaks, Camping Goods, Golf, Tennis and Sportsmen's Supplies of every description.

CONTRARY to the general impression formed from greatly exaggerated reports in the daily press the losses of the wholesale jobbing houses in Mobile, Ala., from the great storm which swept over some of the Southern States on the 26th ult. were very small, except in the case of grocery and dry goods merchants, whose perishable stocks were badly damaged by the flood of water. With the hardware and supply houses the loss was confined for the most part to the expense and labor of moving stock into dry places and cleaning and oiling it. The American Supply Company estimates its loss at between $750 and $1000. The company was particularly fortunate in having a six-story building, the ground floor of which was used for the storage of such heavy material as would not readily damage. Within 36 hours after the falling of the tide the company was actually doing business.

HAYDEN-CORBETT CHAIN COMPANY, Columbus, Ohio, has just completed a brick addition to its Chain factory which is 50 x 200 feet. It is now ready for operation and will increase its capacity 250 tons per month, enabling it to fill all orders promptly.

THE HARDWARE AND IMPLEMENT MERCHANTS of Walla Walla and Columbia counties in Washington and Umatilla County in Oregon held their regular quarterly meeting on September 20 at Walla Walla. About 60 were present and a most pleasant and profitable evening was spent. A uniform time for the settlement of accounts was agreed upon, and it was decided that this time should be October 1 each year but that farmers and other customers should have until November 1 to settle, and if settlement was not made during October interest should be charged from October 1.

F. E. KOHLER & Co., Canton, Ohio, announce that tney are extending their line of hand Agricultural Implements and would be pleased to send circulars or catalogues to all the trade who are interested. On October 1 they completed their twenty-seventh year of business, during which time there has been no change of partners.

ALBERT J. SMART AND ROLLIN S. BASCOM, Greenfield, Mass., are to organize a company for the manufacture of Taps. The location of the plant has not been definitely decided, but it will undoubtedly be in Greenfield or the immediate vicinity. Mr. Smart has been connected with the Wiley & Russell Mfg. Company for 33 years, much of the time as superintendent of the works, and Mr. Bascom has been with the same company for 25 years, for a long time as assistant superintendent.

THE OHIO HARDWARE ASSOCIATION, of which Frank A. Bare, Mansfield, is the efficient secretary, has issued an interesting and attractive booklet giving the constitution and by-laws and list of members of the organization. The list of members is given twice, first alphabetically arranged as to firms and then as to addresses. An imposing list of honorary members is also given, together with some data in regard to the National Retail Hardware Association. The 1907 convention of the Ohio Association will be held at Columbus, February 26, 27 and 28.

HARDWARE CITY TRUST COMPANY.

THE HARDWARE CITY TRUST COMPANY, New Britain, Conn., which was incorporated a few months ago, held its first annual meeting on the 8th inst. The stockholders elected the following board of directors: Charles M. Jarvis, George P. Hart, Howard S. Hart, George W. Corbin, Charles F. Smith, B. A. Hawley, Charles H. Parsons, Judge James E. Cooper, D. A. Niven, Clarence A. Earl, George L. Damon, Norman P. Cooley, Charles J. Parker, Howard C. Noble, C. B. Stanley, Frank G. Vibberts and Frank J. Porter. Many of these gentlemen will be recognized as prominently identified with the Hardware manufacturing interests of New Britain. At the close of the stockholders' meeting the directors met and elected the following officers: President, Charles M. Jarvis; vice-president, George P. Hart; secretary and treasurer, Frank G. Vibberts. Mr. Jarvis is vice-president of the American Hardware Corporation and Mr. Hart is vice-president of the Stanley Works and a director of the Stanley Rule & Level Company.

AMONG THE HARDWARE TRADE.

The Boyes Hardware Company is the title of a new Hardware firm at Caldwell, Idaho.

The Payette Plumbing Company, Payette, Idaho, has recently added the sale of Hardware.

W. F. Chalenor has reopened in the Implement business at Palouse, Wash.

J. H. Botten, Hardware and Implements, Troy, Idaho, is building a new brick store building.

The store of Clarke & Eaton Company, Hardware and Implements, LaCrosse, Wash., was recently burned out. The loss was $5000, with insurance of $3000. The company will rebuild and resume.

The establishment of the Hopper Hardware Company, Farmington, Wash., was completely destroyed by fire a short time since. The loss, about $12,000, was fully covered by insurance.

Morrison & Co. have succeeded to the Hardware business of Lequime Bros. & Co., at Kelowna, B. C.

D. E. Stevens & Son are a new Hardware firm at Princeton, Idaho.

G. W. Berkheimer, Carson, Iowa, has sold out his Hardware stock and is running a general store.

J. A. Cullers, Scandia, Kan., has sold a half interest in his Hardware store to E. C. Goodwin. The business will be continued under the style of Cullers & Goodwin.

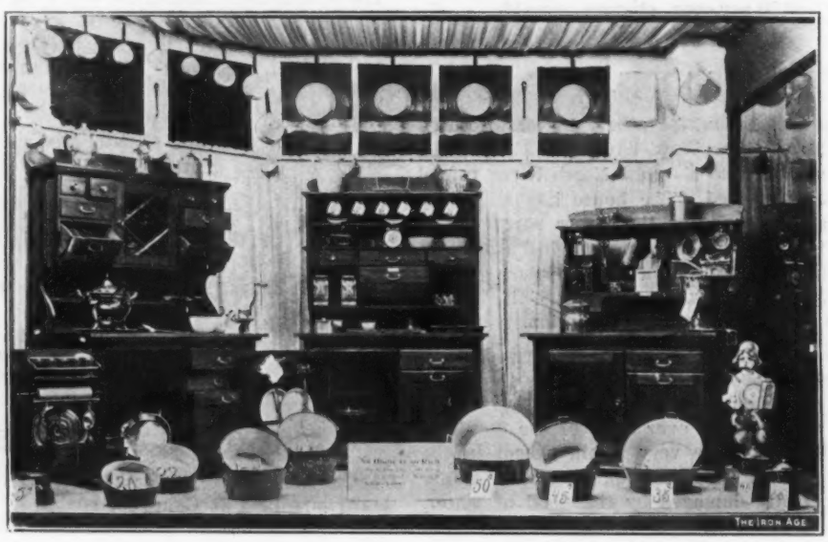
Davis-Oesterle Hardware Company has been incorporated at Prosser, Wash., with a capital stock of $10,000.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

KITCHEN FURNISHINGS WINDOW DISPLAY.

ILLUSTRATED herewith is a recent window display of the E. N. Howell Hardware Company, Dixon, Ill. It will be recognized as an exceptionally tasteful and attractive exhibit of the goods featured. The window is 12½ ft. wide and 8 ft. deep. The general object of the exhibit was to show Kitchen Furnishings and particularly Kitchen Cabinets and Enameled Ware. The floor of the window was covered with glazed wall paper with a figure in imitation of tile. The back and ceiling were covered with white cheese cloth. The Enameled Ware which is priced is a cheap grade and was quoted close to cost to meet the competition of two 10-cent stores in the neighborhood. The Enameled Ware hanging on the back and side of the window is of the highest quality and was not priced. Good sales resulted from the exhibit, and the firm states that it was more effective than newspaper advertising in offsetting the efforts of the competition referred to.



Kitchen Furnishings Window Display.

ADVERTISING IN ARKANSAS.

C. T. ROSENTHAL, Batesville, Ark., has found a liberal use of electrotypes in his advertising, newspapers, circulars, &c., very effective. Many of these



electrotypes are furnished by manufacturers of goods handled by him. Others have been originated and made at his own expense, such as the two which are reproduced herewith. The disk and "ink spot" cuts are sometimes given a place in Mr. Rosenthal's advertisements in the country newspapers of his territory, but are used more freely in circulars, on nail bags, wrapping paper and in other directions. So much advertising is done nowadays, not always of a trade-winning character that Mr. Rosenthal, who is a successful merchant of nearly 30 years' experience, considers it of the first importance to have something about his copy that will catch and hold the eye, something different from the great multitude of announcements. The attention having been arrested, it is then up to the merchant to exploit his wares and business in a manner which will be convincing or at least impressive.



WINDOW DISPLAY PROFITABLE.

THE SHACKLETT-THOMAS HARDWARE COMPANY, Fulton, Ky., makes an earnest endeavor to get all the advertising advantage possible out of its show windows. The arrangement of the windows is entrusted to one of the clerks, who has proved very efficient in getting up attractive displays. The exhibits are mostly confined to new goods and those which are out of the beaten track of Hardware and not generally called for. The window displays are frequently changed so that the public has got in the habit of looking at them to see what's new. Several months ago the company covered the back and ceiling of the windows with green felt, on which to display metal goods. This line is thus presented in a manner which is at once distinct and attractive.

J. D. Stewart has sold his Hardware and tin shop on Main street, South Fork, Pa., to John S. Wicks, and will move to Williamsburg, Blair County, Pa., where he will open another store in the same line.

Business System for the Retail Merchant.

We give below the first of a series of articles by John A. Manson of John A. Manson & Co., Burlington, Vt., on the systematic conduct of the retail Hardware business. The first article is of an introductory character and will be followed by others in which the subject will be treated under special heads.

MR. MANSON is well qualified to write on this important subject in view of his experience and success as a Hardware merchant. Born in Scotland in 1865, he came to this country with his parents in 1870. At the age of 17 he started to learn the Hardware business with Geo. I. Hagar of Burlington. Mr. Manson refers to the four years thus spent as his "high school education" in Hardware. Having reached maturity, he went to New York to obtain a position as traveling salesman. After a good deal of personal canvassing and correspondence Mr. Manson finally secured a place with the Tower & Lyon Company, which he represented for a period of eight years beginning with 1887, most of this time being spent in the South and West calling on the leading Hardware merchants in 80 cities in 29 States. Having thus obtained his "college education in the Hardware trade," Mr. Manson embarked in business for himself in Burlington in 1894 and has succeeded in building up a large and constantly increasing trade. He has devoted much of his leisure time to making a critical study of business conditions generally and store conduct and arrangement and has developed a number of short cuts and safeguards which it will be our privilege to describe in subsequent issues.



JOHN A. MANSON.

SYSTEM FOR THE RETAILER.

BY JOHN A. MANSON, BURLINGTON, VT.

System is the great factor that enables manufacturers, jobbers, department stores and catalogue houses to do business on close profits. Safeguard methods are in use by them which insure thoroughness and quick action all along the line, and goods do not get away from them without being properly booked, nor is credit given indiscriminately. In these days of sharp competition the retailer must do business systematically. Everlasting application and knowledge of business are bound to win out for him, and had he been awake to conditions 20 years ago as he is to-day the mail order catalogue house would not have made the inroads on his business that it has in many places.

Methods That Will Succeed.

The retailer has all kinds of competition to meet, for many manufacturers, jobbers and catalogue houses go direct for his trade. Notwithstanding this, the retailer is bound to be the main distributer and introducer of goods direct to the consumer and can command the cream of the trade in his locality by doing business in a thoroughly modern way, by being well equipped with capital and experience, carrying stock well adjusted to the demands of his trade, goods classified conveniently and attractively arranged, displayed and priced, and by giving careful attention to extending credit and collecting. He must sell high grade goods at legitimate prices, standing back of them and giving satisfaction to his customers. He must do business thoroughly, promptly and safely, learning and improving all the time. He should be a judicious advertiser, and in addition to newspaper and circular advertising should use his store windows and store interior to good purpose. The successful retailer must be

A Master of Details,

for the nature of his business is indeed varied. He receives local orders by telephone to be delivered or called for; orders are taken by clerks, some of which are charged, some paid for and some to be paid when delivered or called for. Many orders received must be shipped by freight, express or mail. Some orders call for odd goods to be ordered specially and often made to order; others for goods to be shipped direct to customers from factories. The retailer certainly needs modern business methods to safeguard these varied transactions and insure definite and positive results. He must have cash, credit and delivery methods that are thorough in detail and afford records showing that no goods are being delivered without having been charged or paid for.

Importance of Builders' Hardware.

The Builders' Hardware trade should not be a mystery for the retailer; he should be thoroughly familiar with building plans and specifications and effect sales without the help of the factory salesman. A man who is clever enough to be established in the Hardware business should be clever enough himself, or have some one in his employ clever enough, to handle this important part of his business.

Methods of Buying.

Stock should be carefully watched and new goods ordered in good season. The systematic use of a want book is important. Copies of all orders placed should be kept and shipments hurried accordingly. Many merchants have interchange accounts with competitors; when goods are so obtained they should be recorded, so that a check-off can be readily made when goods are received. Invoices of goods purchased should be carefully checked, priced and figured and a clear record should be kept of all freight received and the charges on same. Some merchants consider freight as expense. On many lines of merchandise freight charges are 5 to 10 per cent. of the cost and should be considered as additional cost of goods.

New Conditions Demand New Methods.

The majority of retailers realize the changed and changing conditions in trade to-day and are aware that their salvation is in doing business thoroughly and systematically. It is well that this is so and that trade should not be centralized in the large cities of the country. The retailer is one of the mainstays of the nation's prosperity, and his store the preparatory school of the future successful merchants.

(To be continued.)

The Palace Hardware Company has incorporated at Tacoma, Wash., with a capital stock of $15,000.

CHICAGO SPECIAL TRAIN TO ATLANTIC CITY.

THE special train which will carry the visitors from Chicago and the West to the conventions of the American Hardware Manufacturers' Association and the National Hardware Association at Atlantic City, N. J., Wednesday, Thursday and Friday, October 17, 18 and 19, will leave Chicago at 3 o'clock p.m. on the afternoon of Monday, October 15. The train will run just 15 min. behind the 18-hr. train, arriving in Atlantic City about noon on the 16th. The "Hardware Special" will consist of eight cars, with two dining cars in the center of the train and an observation car in the rear. A dinner will be given on the train by the manufacturers and their agents to every one included in the party at 6 o'clock in the evening of Monday, the 15th. All arrangements have been made and are in charge of W. H. Bennett. The party going on the special train will include the following:

V. E. Hamilton, Huber & Kalbach Company, Oskaloosa, Iowa.
Palmer W. Holmes, Lalance & Grosjean Mfg. Company, Chicago.
Chas. M. Hurst, Morehouse-Wells Company, Decatur, Ill.
D. O. Macquarrie, Corbin Cabinet Lock Company, Chicago.
W. G. Miller, Ohio Tool Company, Chicago.
S. R. Droescher, New York City.
Daniel Stern, *American Artisan*, Chicago.
F. W. Heitmann, F. W. Heitmann Company, Houston, Texas.
C. L. Schwartz, Lee Hardware Company, Salina, Kan.
W. C. Stephens, P. & F. Corbin, Chicago.
W. L. Sanford, E. C. Atkins & Co., Chicago.
W. J. Gold, Chicago Hardware Company, Chicago.
F. M. Baldwin, Baldwin Forging & Tool Company, Columbus, Ohio.
M. L. Corey, secretary National Retail Hardware Association, Argos, Ind.
E. M. Bush, president National Retail Hardware Association, Evansville, Ind.
S. R. Miles, member Executive Committee, National Retail Hardware Association, Mason City, Iowa.
W. F. Wallace, the *Bulletin*, Argos, Ind.
J. D. Warren, J. D. Warren Mfg. Company, Chicago.
J. G. Bauer, W. A. L. Thompson Hardware Company, Topeka, Kan.
J. B. Silliman, Blish, Mize & Silliman Hardware Company, Atchison, Kan.
G. W. Welles, Kelley, How, Thomson Hardware Company, Duluth, Minn.
T. G. Walthers, Hackett, Walthers, Gates Hardware Company, St. Paul, Minn.
T. J. Usher, Russell & Erwin Mfg. Company, Chicago.
W. L. Harvey, Garland Nut & Rivet Company, Chicago.
J. A. Warner, Wyeth Hardware & Mfg. Company, St. Joseph, Mo.
Geo. J. Adams, Norwalk Lock Company, Chicago.
D. W. Simpson, Wilcox Mfg. Company, Aurora, Ill.
W. C. Dickey, Ward-Dickey Steel Company, Indiana Harbor, Ind.
D. A. Merriman, American Steel & Wire Company, Chicago.
R. T. Lund and C. T. Johnson, Dover Mfg. Company, Canal Dover, Ohio.
Arthur Brittan, Chicago.
F. W. Fee, Corbin Screw Corporation, Chicago.
G. W. Trout, Trout Hardware Company, Chicago.
H. A. Taylor, American Screw Company, Chicago.
D. B. Gann, Chicago.
E. A. Hoffman, Hoffman Hardware Company, Los Angeles, Cal.
C. D. Clark, Clark, Quien & Morse, Peoria, Ill.
Fred. Ford, Eagle Lock Company, Chicago.
F. J. Camp, Brown-Hurley Hardware Company, Des Moines, Iowa.
Geo. Boole, Western Hardware & Metal Company, Seattle, Wash.
E. M. Kemp, Wabash Screen Door Company, Chicago.
W. H. Bennett, Lawson Mfg. Company, Chicago.
J. A. Roberts, Pittsburgh Steel & Wire Company, Chicago.
C. C. Philbrick, Foster, Stevens & Co., Grand Rapids, Mich.
W. H. Webber, secretary Southern Hardware Jobbers' Association, Fort Smith, Ark.
F. E. Cutler, Cutler Hardware Company, Waterloo, Iowa.
A. T. Simonds and C. F. Braffett, Simonds Mfg. Company, Chicago.
Walter W. Birge and S. D. Burrell, St. Louis Shovel Company, St. Louis, Mo.
H. G. Reynolds, Reynolds Wire Company, Dixon, Ill.
Don McMillan, Chicago.
J. C. Kroner, La Crosse Corrugating Company, La Crosse, Wis.
W. H. Eaton, American Sheet & Tin Plate Company, Chicago.
W. J. Wetstein, American Sheet & Tin Plate Company, St. Louis, Mo.
A. A. Ainsworth, *The Iron Age*, Chicago.
Frederick Pease, Chas. Parker Company, Meriden, Conn.

Some of the members of the party will also be accompanied by their wives and daughters.

Miller & Corbett is the title of a new Hardware firm at Cottage Grove, Ore.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM C. A. BERGH & Co., Hardware merchants of Winona, Minn., who conduct the Cash Hardware Store.

FROM RAU & STEINKE, Garden Plain, Kan., successors to the Hardware, Stove, Paint and Implement business of Rau & Kramer.

FROM ROSS HARDWARE COMPANY, Fort Gaines, Ga., successor to Ross & Clifton Hardware Company, which is in the market for Hardware, Mill Supplies, Silver Ware, Paints, Oils and Agricultural Implements.

FROM HARMEYER & WEISHAAR, West Point, Iowa, who have bought the Hardware and Implement business of J. W. Conley.

FROM BOYES HARDWARE COMPANY, a new Hardware, Stove, Paint and Sporting Goods house in Caldwell, Idaho.

FROM KENNEDY BROS. & KELLAM, Richmond, Va., who have incorporated with a capital of $40,000 to conduct a wholesale and retail Shelf and Heavy Hardware, Stove, Paint, Sporting Goods, Pipe and Roofing business, succeeding the Hardware branch of Sitterding-Carneal-Davis Company. D. C. Kennedy, president of the concern, and J. E. Kennedy, secretary, have been in the employ of Baldwin & Brown, the former having been the manager of that firm. Mr. Kellam, treasurer, has been with Warner Moore & Co. for several years, while T. D. Parriot, vice-president, is a member of the firm of Parriot Bros. and also of Kirk-Parriot Company.

FROM POWERS & THOMPSON, Muncie, Ind., successors to the Hardware business of James R. Johnson.

FROM L. B. COBB, who will remove his Hardware, Plumbing and Heating business from S. Deerfield to Montague, Mass., on October 1.

FROM MORROW-THOMAS HARDWARE COMPANY, successor to Stringfellow-Hume Hardware Company at Amarillo, Texas.

FROM JOHNSON-GARY HARDWARE COMPANY, successor to Stringfellow-Hume Hardware Company at Hereford and Canyon, Texas.

FROM WIXSON BROS. COMPANY, Milwaukee, Wis., which has been incorporated with a capital of $25,000 to conduct a wholesale Paint and Hardware Specialty business and which will act as manufacturers' agent, calling on the trade in Michigan and Wisconsin.

FROM HUNT HARDWARE COMPANY, Colville, Wash., which has been incorporated with a capital stock of $12,000 by Chas. A. Hunt and others.

SAMUEL L. WADSWORTH, senior member of the firm of S. L. Wadsworth & Son, Eastport, Maine, died September 20 after an illness of several months. He was 76 years old and was not only the oldest Hardware merchant in his part of the State, but had been continuously in business longer than any other man in Eastport. His early years were spent at sea, but in 1853 he entered the employ of his father in the business with which he has been identified ever since. After the elder Wadsworth retired the son took a partner, forming the firm of Wadsworth & Ritchie, but they were burned out in the great fire of 1864 and Mr. Wadsworth resumed and continued alone until 1883, when he admitted his son, Frank J., into the present firm. Mr. Wadsworth was widely and favorably known in the trade and highly respected in his community.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

BUTLER BROS., Chicago: Monthly catalogue for October, with prices, that hold good until the November issue is out, on an immense assortment of merchandise for retail merchants exclusively.

HAYES PUMP & PLANTER COMPANY, Galva, Ill.: Illustrated catalogue covering an extensive line of Planters, Cultivators, Grain Drills, Pumps, &c.

KNAPP ELECTRIC & NOVELTY COMPANY, 511-513 West Fifty-first street, New York: Catalogue No. 17 of Kenco Electric Specialties and models in miniature.

SKINNER CHUCK COMPANY, New Britain, Conn.: 1906 price-list of Lathe, Planer and Drill Chucks, Lathe Face Plates, &c.; also price-list on leaves to fit No. 6 Morden loose leaf price book.

D. W. BOSLEY COMPANY, Chicago: Illustrated catalogue of Rubber and Felt Weather Strips, Window, Bar and Counter Cleaners and Floor Scrubbers.

ARROW CAN COMPANY, 35 Warren street, New York: Price-list circular referring to Arrow Pressed Steel Ash and Garbage Cans.

BUFFALO SCALE COMPANY, Buffalo, N. Y.: Illustrated circulars relating to Dormant and Platform Scales.

PITTSBURGH SHOVEL COMPANY, Leechburg, Pa.: Price-list of Handles and Wood Specialties.

BRIDGEPORT HARDWARE MFG. COMPANY, Bridgeport, Conn.: Catalogue of Nail Pullers, Box Openers, Screw Drivers, Nippers and other Hardware and Cutlery specialties.

UNIVERSAL CASTER & FOUNDRY COMPANY, 1170 Broadway, New York: Illustrated catalogue listing a complete line of Casters for pianos, bedsteads, furniture, &c.

OSGOOD SCALE COMPANY, Binghamton, N. Y.: Circulars and price-lists referring to Wagon, Farm and Stock Scales, &c.

GRAY & DUDLEY HARDWARE COMPANY, Nashville, Tenn.: Catalogue of Stoves, Ranges, Heaters and Kitchen Utensils.

CHICAGO SCALE COMPANY, Chicago: Booklet referring to a line of Scales, Trucks, Sewing Machines, &c., and special circulars referring to Wagon or Stock Scales, Scale Racks, &c.

READING HARDWARE COMPANY, Reading, Pa.: Illustrated catalogue listing an attractive line of Lawn Mowers.

CHALLENGE COMPANY, Batavia, N. Y.: Catalogues No. 46, referring to Pumps; No. 47, referring to Feed Grinders, Wood Saws, &c., and No. 48, referring to Windmills.

FORSYTH MFG. COMPANY, Buffalo, N. Y.: Catalogue of Bathroom Accessories and Molding Hooks; also circulars referring to other specialties.

RICHARDSON BALL BEARING SKATE COMPANY, Chicago: Catalogue of Roller Skates, with hints and suggestions for operating rinks.

C. A. CHAPMAN, Geneva, N. Y.: Pamphlets illustrating Clothes Driers for the window, balcony, veranda and yard; Cake Molds, Egg Whips, Measuring Cups, Skimming Spoons, Cream Dippers and Reversible Corn Poppers.

WARWOOD TOOL COMPANY, Wheeling, W. Va.: Handsomely bound and illustrated catalogue referring to a complete line of Picks, Mattocks, Grub and Hazel Hoes, Coal Miners' Tools, Wedges, Sledges, Crow Bars, &c.

OAKMAN MFG. COMPANY, 84-86 Chambers street, New York: Illustrated booklet describing the Oakman system of distance gas lighting by air pressure or air exhaust and the Oakman Self Lighting Gas Burner.

LAMSON & GOODNOW MFG. COMPANY, Shelburne Falls, Mass., New York representatives Oakman Bros. Company, 45 Murray street: Illustrated folder of Anchor Brand Carvers in sets, of which 250 patterns are made.

HENRY R. WYKERT, 1519 Leavenworth street, Omaha, Neb.: Circular illustrating and describing the Soldier's Friend Camp Cot.

ADJUSTABLE CLAMP COMPANY, Chicago: Illustrated price-list of Jorgensen Patent Wood Clamps.

C. W. GAUSE COMPANY'S TRADEMARK.

C. W. GAUSE COMPANY, 309 Market street, San Francisco, Cal., factory sales agent for Hardware and kindred products, has adopted the unique trademark illustrated herewith, which is a sequel to some lines entitled "Earthquake Philosophy," which Mr. Gause wrote



C. W. Gause Company's Trademark.

a short time after the San Francisco calamity and which were reproduced in our columns. The company finds that the double task of first sawing wood and piling it afterwards is giving plenty of work and keeping the force on the move all the time.

REPUBLIC METALWARE COMPANY'S CATALOGUE.

REPUBLIC METALWARE COMPANY, Buffalo, N. Y., is distributing among the trade its catalogue No. 70, an impressive book of nearly 500 pages, attractively bound and profusely illustrated with half-tone cuts. It refers in detail to the company's brands of Niagara and Aetna Enameled Ware, Savory Roasters and other Kitchen Specialties, besides complete lines of deep and shallow Stamped Ware, Pieced Tinware, Japanned and Anti-Rusting Tinware; also to Black and Galvanized Sheet Steel Ware, Copper Ware, Milk Cans, Creamery Pails, &c.; miscellaneous Stove and Kitchen Goods and Metals, including Tinsmiths' Trimmings and Jobbing Supplies. The catalogue alludes to large additions to the company's plant, necessitated by the demand for its goods, including its newly completed Tecumseh sheet factory, which is illustrated. Accompanying printed matter refers to the company's new selling idea by which it is proposed to interest boys and girls in pushing the sale of its goods through a premium scheme operated by retail merchants.

WILLIAM H. COLE.

WILLIAM H. COLE, for many years with the Tower & Lyon Company, New York, and long its treasurer, has recently connected himself with the Oliver Brothers Purchasing Company, 127 Duane street, New York, buyer for jobbers of Hardware, Iron, Steel, Mill, Mining, Railway and Engineers' Supplies, &c. Mr. Cole will devote a large part of his time to the oversight and management of the details of office work and at intervals as opportunity offers will visit throughout the country both the clients and manufacturers with whom the Oliver Company does business, thus enabling it to keep in closer touch with these interests than is possible through the medium of correspondence alone. Mr. Cole has a wide acquaintance in the trade and his many friends among both merchants and manufacturers will be glad to resume relations with him in his new connection.

Amory Hardware Company, capitalized at $4000, has been incorporated at Amory, Miss., by E. D. Gilmore, A. G. Thompson and others.

AGRICULTURAL IMPLEMENT AND VEHICLE MANUFACTURERS IN CONVENTION.

THE thirteenth annual convention of the National Association of Agricultural Implement and Vehicle Manufacturers is in session this week at Chicago. The convention headquarters are at the Auditorium Hotel and the convention sessions are being held in the assembly room of that hostelry. The programme embraces the usual addresses by officers and reports by chairmen of standing committees. The Executive Committee has also arranged for three special addresses; one of these to be delivered by A. W. Bulkley of the Chicago Bar on the subject of "Corporations;" a second on "Insurance" by John W. Waters of Indianapolis, and a third on "Tests of Vehicle Woods" by H. B. Holroyd of the Department of Agriculture at Washington. The Chicago Committee on Arrangements for the convention, composed of representatives of accessory lines, has arranged elaborate entertainment for the delegates and their ladies, the programme including a theater party Tuesday evening; an automobile ride and luncheon for the ladies Wednesday at the Evanston Golf Club; a visit to the "White City" Wednesday evening, and an elaborate banquet at the Auditorium Hotel Thursday evening. The Chicago Committee of Arrangements is as follows: W. M. Thompson, Kelley, Maus & Co., chairman; George A. Stone, Norton Emery Wheel Company, secretary; S. E. Bliss, Metropolitan Trust & Savings Bank, treasurer; Louis M. Henoch, Joseph T. Ryerson & Son; D. A. Merriman, American Steel & Wire Company; Elliott Durand, Heath & Milligan Mfg. Co.; W. R. Garberson, Pickands, Brown & Co.; E. J. Eames, Carborundum Company; Ricord Gradwell, Oliver Typewriter Company; John P. Nicholas, International Harvester Company; B. E. Hamilton, Illinois Steel Company and Carnegie Steel Company; Jas. E. Hubbert, Republic Iron & Steel Company; and E. J. Baker, *Farm Implement News*.

CULTIVATING FOREIGN TRADE.

Among the reports made by committees is one by F. E. Myers, of F. E. Myers & Bro., Ashland, Ohio, chairman of the Committee on Foreign Commerce. Mr. Myers' report is an interesting one, touching as it does on the necessity of American manufacturers cultivating foreign trade, and we give the following extracts from it:

We must equalize conditions in some way and adopt the broadest possible methods by subsidies or otherwise so as to place us on a basis that will enable us to compete with other nations, and, as far as possible, transport our wares at the lowest ruling shipping rates and conditions and attain the commercial and industrial supremacy of the globe. America should cross both oceans and conquer. The all-prevailing and wonderful resources of this Western continent will certainly revolutionize commercial conditions. Our strength and station in the alignment of the nations is the envy of other nations and the arbiter of the world. Americans could live and thrive upon their own products for centuries. And as long as this is true and we are true to ourselves we should triumph, as we can, in commercial expansion and development.

We Stand Not Only at the Head

of the great manufacturers of the nations of the world, but our output equals that of Germany, France and the United Kingdom combined. We certainly do not need high protective tariff. We can compete substantially with any country in the world without protection. While labor is cheap in foreign countries, it is not for the work done. If we can work our artisans nine and ten hours a day and secure results, as we do, supported by our reciprocity treaties, why should we continue protection? Your chairman, with the observations he has made in foreign countries, recommends that we take chances with any nation and also recommends a reconstruction of our tariff conditions.

The civilized nations of the world want the product of our factories because of its acknowledged superiority and construction. The market for manufactured goods in foreign countries is over $4,000,000,000. The production of manufactured goods in this country has increased three times as fast as its population. The possibilities of the United States have never been so fully realized.

We Are the World's Greatest Producers

of the principal manufactured articles. We have the world's greatest supply of coal and gas for the turning of material into the finished product. We have the greatest supply of capital for large production, the best machinery, the most ingenious workmen, the most successful business men, and the world is our market.

Back of the general growing demand we have material, workmen and capital unequaled on the globe, and a growing reputation for achievement. The question before this membership is, "Do you want foreign trade and are you inclined to support our position as outlined?" No subject before the American manufacturer is so vitally important as the question, "What shall we do, and are we in shape to go after foreign trade properly?" We urge serious deliberation on this point. Do not under any circumstances undertake to distribute your product in foreign fields

Unless You Have the Capacity and Capital

and have defined plans so that you can be depended upon and found worthy of the confidence of foreign buyers, as the distant foreign buyer must have confidence with our system of "cash with order" and "you must buy of us," &c. We recommend more liberal treatment of customers, reciprocity and the accumulation of thoroughly reliable statistics. Do not copy old and antiquated implements or goods simply to supply what they have already been buying. Dealers all over the world look to the American manufacturer for something better than they formerly had to accomplish the work. What you must know is what the implement is intended to accomplish and be absolutely sure that it will do it.

The Indiscriminate Quoting of Prices

to every foreign buyer has caused some of the large importing firms to refuse certain makes of goods on the ground of meeting competition that would leave no profit. Do not quote prices to unknown parties. Foreign houses look upon such methods as resembling those of catalogue houses. Write, asking for further information as to the wants, and in the meantime take steps to find out who the parties are and their standing. Keep your customers fully advised by up to date literature of all changes and improvements made, and, rather than substitute, cable if necessary whether the goods can be used with the changes or not.

Substituting in Orders

has been done so frequently that foreign buyers have made protest to our consuls and many losses have been sustained because the parties would not receive the goods. This has done much to create a feeling of distrust between the American manufacturer and the foreign buyer. Take extreme care against errors in packing or breakage in transportation, and see that all goods are of good quality, carefully made and shipped on time.

Study Traditions and Customs.

Personal investigation and careful thought prove conclusively that we cannot impose our American methods in the different foreign countries any more than we can compel them to accept our currency. Do not undertake to ride rough shod over ancient traditions and customs. We recommend a close study and familiarity with consular and trade reports, statistical abstracts, commercial relations and summary table of commerce, prices, &c.

Commercial Attaches.

A noticeable step for the betterment of our consular service was made when President Roosevelt in a special message to Congress recommended the appointment of six special agents of the State Department, with the diplomatic rank and title of "commercial attache," to be appointed preferably from the consular service and to be sent abroad, subject to transfer at the discretion of the Secretary of State, to make a study of the conditions in foreign countries and report to the Department of State conditions existing in foreign countries, to prepare for the Department of Commerce and Labor reports upon commerce and manufactures of kindred topics, to visit the consulates and examine their workings, and to suggest changes to the Department of State that would tend to the general improvement and strengthen the service. These agents are to cover a wide scope of territory. One is to be sent to Austria and the Balkan States, Germany, Switzerland, Russia and other countries of northern Europe; one to France, Italy, Portugal, Spain and the other countries bordering on the Mediterranean; the third to Great Britain and her dependencies; the fourth to Mexico, Central America, the West Indies and South America; the fifth to Asia, more particularly Asiatic Russia.

China and Japan, and the sixth to be held in reserve for special service and particular missions to any part of the world.

Our representatives in the consular service are recognized by foreign nations as our business agents, and as such they should be the most capable men that we can secure. Much has been done in late years to raise the standard of efficiency, but that there is still room for improvement will not be questioned.

British and German Consular Service.

As evidence of the attention paid to the securing of specially trained representatives in the consular service of foreign nations it may not be inopportune to refer here to the qualifications necessary to secure appointment in Great Britain. It is an absolute requirement that English be understood perfectly. The candidate must also speak French and at least one other language, Spanish or German, and be able to speak them fluently. He must also possess a thorough knowledge of British and commercial law relating to shipping, negotiable instruments, bills of exchange, promissory notes, contracts for the carriage of goods, marine insurance, &c. Germany also has a similar course of training for her representatives in the service. The German consul speaks the language of the country to which he is accredited like a native, and in addition French and English.

This thorough course of training undoubtedly accounts for the large foreign trade of these two countries and the goods marked "Made in England" or "Made in Germany" on the wharves of the countries all over the civilized world.

Our Foreign Trade Not What It Ought to Be.

In 1860 we stood at the bottom of the list of the four great manufacturing nations—namely: The United Kingdom, France, Germany and the United States. Forty-five years later we stand at the head of the list, our manufactured product equaling that of the other great nations combined. To retain our position and increase correspondingly we must look to Asia, Africa, South and Central America, Mexico and Australia, who have no well developed manufacturing interests.

We are inclined to urge on Congress the need of encouraging American shipbuilding, or, at least, the owning of shipping interests by Americans. There is no denying the fact that this country is not enjoying the foreign trade that it should. We cannot refrain from urging upon our members greater efforts and more attention to this subject. Our manufacturing capacity has increased enormously, justifying the consideration we most respectfully solicit for this, the report of your committee.

THE MICHIGAN RETAIL HARDWARE ASSOCIATION, making a determined effort to preserve throughout the entire year the great enthusiasm which developed at the last annual meeting in Detroit, and to increase its membership, has decided, through its Executive Committee, to accept new members between now and the first of the year and for $4 give them a receipt until December 31, 1907. It is believed that this special rate will be an inducement for some merchants to join who otherwise would postpone enrollment until next year and perhaps indefinitely. The same arrangement, by which the traveling men who take the application get $2 of the membership fee, still holds good, and many acquisitions to membership are expected through this channel. The present membership of the Michigan Association is 675, and the vigorous methods which are being employed to interest the Hardware merchants who are not members should very materially increase the total enrollment before the next annual meeting.

PATTERSON, GOTTFRIED & HUNTER, 146-150 Centre street, New York, have issued two attractive booklets referring to Automobile Specialties, which they are offering to the trade, the Champion High-Low Jack and the Champion Automobile Repair Kit. The booklets are striking in appearance, being bound in yellow with type in red and lively automobiling views in black. The story of the Repair Kit is told in verse, taking the form of a parody on Kipling's "Vampire," and having one stanza with an appropriate cut on each page. The Jack is described in a forcible way and four telling reasons, each on a separate page, are given for its use. The booklets will be furnished for distribution by the trade.

HARDWARE PRODUCTION IN THE UNITED STATES.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., October 9, 1906.

THE Census Bureau has completed the compilation of the returns covering the production of certain articles of Hardware in the United States in 1905, and through the courtesy of Mr. Stuart, chief of the Bureau of Manufactures, the correspondent of *The Iron Age* is enabled to present these statistics by States in a comparison with the returns for 1900. The showing is remarkable and reflects in a notable manner the unparalleled prosperity of the country. The classification of Hardware by the Census Bureau does not include Cutlery and Edge Tools, Files or Saws, which products will hereafter be separately reported. The term "Hardware" is thus used in a much more narrow sense than is customary in the trade, but the statistics given are interesting and suggestive.

The returns for 1905 show 445 establishments engaged in the production of Hardware, as compared with 381 in 1900. Many of these establishments produce articles not strictly classed as Hardware, but in all cases the preponderating articles determine the classification, so that of all the establishments included in this compilation more than 50 per cent. of the product is technically known as Hardware. The capital employed in the industry in 1905—which consists of tangible assets and bears no relation to issues of stocks and bonds—amounted to $52,884,078, as compared with $39,311,745 in 1900, a gain of 33 per cent. The wage earners in 1905 numbered 31,713, as compared with 26,463, a gain of more than 20 per cent. Wages ruled higher in 1905, as will be seen from the fact that the total amount paid that year was $14,580,589, as compared with $11,422,758 in 1900, showing an increase of 27 per cent. as compared with a gain of about 20 per cent. in the number of wage earners. Miscellaneous expenses in 1905 gained nearly 100 per cent., rising from $2,612,416 to $5,045,210, an increase very largely due to more liberal expenditures for advertising, commercial travelers' expenses, &c. Higher rents also contributed to the increase in miscellaneous expenses. The cost of materials in 1905 was $15,031,453, as compared with $14,605,244. This was the smallest increase recorded, amounting to less than 3 per cent. The products of the industry in 1905 were valued at $45,770,171, as compared with $35,846,656 in 1900, an increase of 27 per cent. When it is remembered that this comparison covers a period of only five years and shows a percentage gain exceeding the average increase in the usual 10-year census period, the prosperity of the industry since 1900 will be more fully appreciated.

The following tables show the details of the returns for the United States and for all States in which more than three establishments were reported:

United States.

	1905.	1900.
Establishments	445	381
Capital	$52,884,078	$39,311,745
Wage earners	31,713	26,463
Wages	$14,580,589	$11,422,758
Miscellaneous expenses	$5,045,210	$2,612,416
Materials	$15,031,453	$14,605,244
Products	$45,770,171	$35,846,656

California.

Establishments	4	Not separately reported.
Capital	$4,875	
Wage earners	5	
Wages	$2,349	
Miscellaneous expenses	$254	
Materials	$1,457	
Products	$6,940	

Connecticut.

Establishments	75	63
Capital	$29,445,329	$21,694,351
Wage earners	15,488	12,056
Wages	$7,323,041	$5,664,046
Miscellaneous expenses	$2,637,914	$1,333,779
Materials	$6,646,971	$6,576,620
Products	$21,480,652	$16,301,198

Illinois

Establishments	71	54
Capital	$4,504,750	$3,123,065

Wage earners	2,423	1,965
Wages	$1,283,661	$866,662
Miscellaneous expenses	$695,651	$349,970
Materials	$2,172,205	$1,718,631
Products	$5,405,348	$3,727,828
Indiana.		
Establishments	6	7
Capital	$228,800	$427,301
Wage earners	116	428
Wages	$54,026	$164,063
Miscellaneous expenses	$22,009	$19,542
Materials	$104,450	$207,062
Products	$227,688	$586,624
Iowa.		
Establishments	8	5
Capital	$334,214	$249,139
Wage earners	228	244
Wages	$96,740	$64,539
Miscellaneous expenses	$25,914	$30,708
Materials	$113,695	$108,811
Products	$317,065	$311,737
Maine		
Establishments	4	
Capital	$118,174	
Wage earners	50	
Wages	$16,729	Not separately reported.
Miscellaneous expenses	$14,031	
Materials	$35,345	
Products	$85,583	
Maryland		
Establishments	6	10
Capital	$57,832	$107,640
Wage earners	42	65
Wages	$15,996	$21,161
Miscellaneous expenses	$5,470	$3,220
Materials	$26,762	$92,234
Products	$97,021	$173,512
Massachusetts.		
Establishments	34	25
Capital	$1,121,307	$780,845
Wage earners	711	616
Wages	$381,549	$280,190
Miscellaneous expenses	$82,272	$67,419
Materials	$427,760	$299,976
Products	$1,245,444	$805,588
Michigan		
Establishments	14	11
Capital	$531,234	$559,153
Wage earners	583	417
Wages	$251,422	$125,627
Miscellaneous expenses	$73,848	$37,742
Materials	$332,744	$291,767
Products	$839,006	$554,359
Minnesota.		
Establishments	4	
Capital	$32,893	
Wage earners	35	
Wages	$15,038	Not separately reported.
Miscellaneous expenses	$4,583	
Materials	$11,985	
Products	$45,764	
Missouri.		
Establishments	4	5
Capital	$318,822	$369,919
Wage earners	261	501
Wages	$135,353	$161,550
Miscellaneous expenses	$22,349	$19,694
Materials	$105,376	$242,436
Products	$340,690	$753,065
Nebraska.		
Establishments	6	3
Capital	$58,285	$35,000
Wage earners	29	12
Wages	$12,645	$3,700
Miscellaneous expenses	$9,825	$2,120
Materials	$18,975	$7,272
Products	$55,245	$26,640
New Jersey.		
Establishments	24	25
Capital	$1,385,704	$946,289
Wage earners	1 064	933
Wages	$505,044	$377,497
Miscellaneous expenses	$180,449	$55,437
Materials	$485,137	$502,962
Products	$1,714,149	$1,184,278
New York.		
Establishments	65	63
Capital	$4,314,427	$2,547,436
Wage earners	2,356	1,851
Wages	$1,104,231	$812,995
Miscellaneous expenses	$384,065	$155,244
Materials	$1,456,680	$1,338,239
Products	$4,044,156	$2,929,572
Ohio.		
Establishments	32	30
Capital	$3,313,224	$2,568,500
Wage earners	2 852	2,662
Wages	$1,308,350	$1,086,405
Miscellaneous expenses	$224,535	$275,800
Materials	$1,144,845	$1,069,278
Products	$3,695,404	$2,926,693
Pennsylvania.		
Establishments	57	49
Capital	$6,549,992	$5,264,174
Wage earners	5,101	4,095
Wages	$1,932,724	$1,604,362
Miscellaneous expenses	$593,546	$221,804
Materials	$1,658,561	$1,833,381
Products	$5,554,157	$4,843,866
Rhode Island.		
Establishments	4	5
Capital	$19,300	$167,737
Wage earners	7	44
Wages	$3,084	$17,040
Miscellaneous expenses	$2,154	$2,401
Materials	$42,315	$69,650
Products	$62,500	$109,156
Texas.		
Establishments	3	
Capital	$9,350	
Wage earners	8	
Wages	$4,664	Not separately reported.
Miscellaneous expenses	$790	
Materials	$4,425	
Products	$15,230	
Vermont.		
Establishments	5	
Capital	$64,000	
Wage earners	71	
Wages	$22,334	Not separately reported.
Miscellaneous expenses	$3,134	
Materials	$39,439	
Products	$91,325	
Wisconsin.		
Establishments	11	11
Capital	$178,747	$204,434
Wage earners	115	339
Wages	$48,665	$101,419
Miscellaneous expenses	$28,938	$17,050
Materials	$101,929	$122,464
Products	$230,159	$313,045
All Other States.		
Establishments	13	10
Capital	$356,819	$202,762
Wage earners	239	164
Wages	$85,278	$49,168
Miscellaneous expenses	$36,613	$17,352
Materials	$139,836	$85,022
Products	$307,997	$208,170

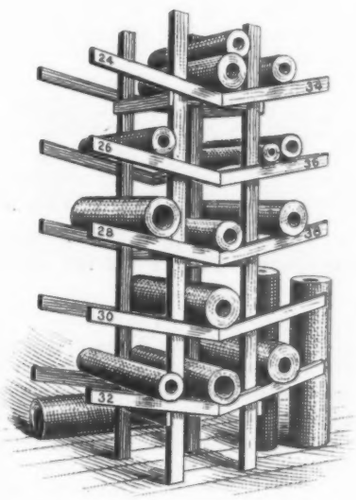
The most significant feature of this exhibit is the overshadowing importance of the State of Connecticut in the Hardware industry. In 1900 no less than 45 per cent. of the output was credited to that State, and although New York, Pennsylvania and Illinois scored heavy gains, Connecticut increased its lead in 1905, when it produced 47 per cent. of the total output. The largest proportionate gain among the leading States is credited to Illinois, the production of which rose from $3,727,828 in 1900 to $5,405,348 in 1905. This was a greater proportionate gain than was made by Connecticut, the product of which increased only 31 per cent. in the same period. New York is also forging rapidly to the front in the production of Hardware, the output having increased in the past five years from $2,929,572 to $4,044,156, or 38 per cent. Pennsylvania, which occupies second place in the actual value of output, gained only 15 per cent. during the five-year period, the product increasing in value from $4,843,866 to $5,554,157. It is a notable fact that while several of the States included in the above table show an actual decline in the value of the output during the past five years, the seven States which reported more than $1,000,000 worth of product in 1900 show heavy gains.

W. L. C.

THE CANADIAN WHOLESALE HARDWARE ASSOCIATION held its eighth annual convention at Hamilton, Ont., on the 27th ult. The following officers were chosen for the ensuing year: President, T. H. Newman, Caverhill, Learmont & Co., Montreal; vice-president, Thomas Dexter, H. S. Howland & Sons, Toronto; secretary-treasurer, J. Hardy, Toronto; Executive Committee, Thos. Birkett, Sr., Thos. Birkett & Sons Company, Ottawa; J. G. Lewis, Lewis Bros. & Co., Montreal; D. H. Howden, D. H. Howden & Co., London, and A. C. Fisher, Rice Lewis & Son, Toronto. Messrs. Newman and Hardy have attended several of the annual conventions of the National Hardware Association on behalf of the Canadian Association and are accordingly well known to many of the jobbers of this country.

WIRE CLOTH RACK.

THE accompanying illustration represents a simple and inexpensive but exceedingly convenient Rack for holding Wire Cloth, devised by H. W. Mills & Co., Paterson, N. J. A bright clerk with a knack for using tools could readily construct it in a few hours. It is made of 2 x 3 in. lumber, planed smooth, which may or may not



Wire Cloth Rack.

be varnished or painted to harmonize with fixtures or adjacent woodwork. The four upright posts are set about 12 in. apart at the ends and 20 in. on the sides of the Rack. They are braced together at the top and bottom side of the rack and 34 to 38 on the three upper arms of the other side. The two lower arms on this side are used for Brass Cloth, while the compartments in the center contain Landscape Cloth. One advantage of this Rack is that everything it holds can easily be got at from either end, so that if one end is kept clear goods may be stored all around it, or it may be built in a corner or against a wall without lessening its convenience.

MISCELLANEOUS NOTE.

Veneered Metal Bedsteads and Costumer.

Coburn Trolley Track Mfg. Company, Holyoke, Mass., has recently issued a finely illustrated catalogue, No. 27, entitled "Beds of Quality." The bedsteads shown, of brass and iron, are made to match the rest of the chamber set in appearance and yet have the sanitary qualities of metal beds. The posts and the top and bottom rails are made of steel tubing, ingeniously covered with various fine hard woods, as quartered oak, bird's-eye maple or mahogany veneer. The corners are cast brass and the filling rods made of seamless brass tubing. The company guarantee that the veneering will neither crack nor peel off in use. In harmony with the various styles of beds already made is a costumer, or clothes tree, of entirely new design, for either hotel bedrooms or private residences, the center post before veneer is put on being 2 in. in diameter. Legs, top and bottom mounts and hooks are made of brass, the over all hight being 74 in.

Gas and Electric Portables.

The accompanying cuts represent new gas and electric portables which, with a large number of others, are shown in catalogue No. 28 of the Goodwin & Kintz Company, Winsted, Conn. Fig. 1 represents a brass portable



Fig. 1.—Brass Candlestick No. 701.



Fig. 2.—Gas or Electric Portable No. 735.



Fig. 3.—Gas or Electric Portable No. 694.

Gas and Electric Portables.

where the projecting arms cross the uprights. There are five sets of these arms, or crosspieces, placed about 1 ft. apart and inclining toward the center so that the rolls of cloth will stay on. The arms are 22 in. long and are fitted together smoothly where their ends meet in the middle of the Rack.

The firm of course carries a complete stock of Wire Cloth, but only a few rolls are shown in the cut to avoid obscuring the construction. It will be seen that the ends of the arms are marked with stencil giving the size of the cloth which they hold, 24 to 32 in. being kept on one

candlestick suitable for either electricity or gas. It may be purchased complete with all electric attachments, including shade, bulb, wire, sockets, etc., ready to light. It is made of brass, and the ornamentation is all hand wrought and of fine workmanship. The lamp is suitable for dining room, library or den, and may be used in connection with silk or glass candle shades. The lamp is finished in antique green, or brass with black relief. In Figs. 2 and 3 additional patterns of gas or electric portables are illustrated. The material is brass with hand applied ornaments. The stands may be fitted complete

for either gas or electricity and are finished in antique green or brushed brass and oxidized black. The stands will be supplied with decorated glass or art glass shades, if desired.

Oakman System of Distance Gas Lighting and Self-lighting Burner.

Oakman Mfg. Company, 84-86 Chambers street, New York, has just put on the market an improved form of the Oakman system of distance gas lighting, Fig. 1 illustrating a single light outfit, consisting of burner, brass tubing (about 1-12 in. outside diameter) and new style air switch about 2½ in. long. This switch is really a combination of two small pump cylinders, outwardly having the appearance of an electric switch. In use a push on one button forces the air in the tubing against a brass rod piston, which from its construction permits of a supply of gas passing regularly to the burner; a push on the other button, by exhausting the air and creating a vacuum, withdrawing the piston, so that a minute quantity of gas by way of a by-pass underneath the burner and thence into a small pilot tube maintains a perpetual light. Thus with the key of the gas bracket turned on a light is always quickly available at a distance without the use of match or taper. As the small pilot flame is in the center of and at the base of the incandescent mantle the life of the mantle is greatly increased, as there is neither explosion in lighting or jar by turning key of fixture as ordinarily. As the pilot light ignites the first flow of gas the mantle is not filled before ignition, thus causing an explosion injurious to mantles that is otherwise unavoidable. The small outer diameter of the very ductile brass tubing makes it possible to run it as easily and inconspicuously as insulated electric wire around sharp or easy corners, and once carefully installed it is always in order, the only working parts needing occasional attention being the piston rod and packing of the small pump plungers. One burner or a group of burners can be lighted and extinguished by graduating the length or force of push on the switch buttons, and hall, cellar, bedroom, show window, storeroom and other lights can be controlled as building is entered, or from room or floor to another. Fig. 2 illustrates the Oakman self-lighting gas burner, trademarked Luz, the Spanish for light. This burner is about 5 in. high over all. The principle is somewhat similar to the burner above described, except that the individual turns the key at the burner instead of manipulating the mechanism at a distance. A turn of the key allows gas to pass directly to the burner, and when cut off permits a small supply of gas to maintain through the pilot tube a small light in center of gauze wire cap at the base of mantle. Stress is laid on the construction of this burner and the high candle-power with low gas consumption, the parts assembling into a form that is low and graceful in outline. The same saving in mantles obtains as instant ignition of gas is assured before the mantle is filled and the larger volume exploded by lighting. The burners are put up one in a box, including mantle wire and an adjustable baffle plate to be used with air globes.



Nitro Special Single Barrel Shotgun.

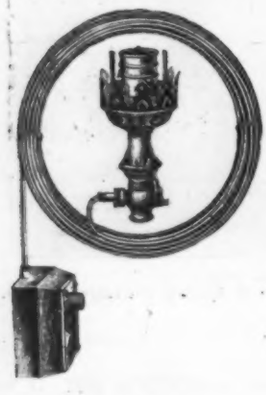


Fig. 1.—Single Light Outfit; Oakman System of Distance Gas Lighting.



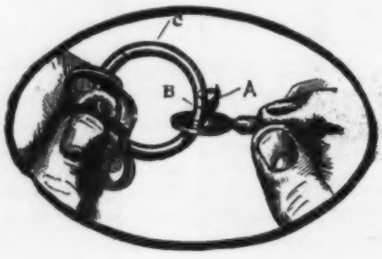
Fig. 2.—Oakman Self-Lighting Gas Burner.

Nitro Special Single Barrel Shotgun.

The single barrel gun here shown is an addition to the line of the J. Stevens Arms and Tool Company, Chicopee Falls, Mass. It has an extra heavy cannon breech, while the barrel is made of high pressure steel with lugs swedged on the barrel, thus becoming a part of the barrel, not brazed on. Owing to its special construction the Stevens Company states that it will stand the heaviest loads of dense powder. The gun has the Stevens check hook to take up wear and to prevent strain on the forearm, and fancy snap forearm. It is supplied either nickel plated or case hardened, with walnut stock, rubber butt plate, top snap, coil mainspring, made in the usual lengths and gauges, and weighs 7 to 7¼ lb. No. 93 is an extractor gun and No. 97 is an ejector gun.

Locking Key Ring.

The Mordan Mfg. Corporation, Waterbury, Conn., is putting on the market the locking key ring shown in the accompanying cut. It is composed of two pieces of steel spring wire, one piece of flat metal and two pins or rivets. To open the ring the inner projecting edge of the flat latch A is pushed outward, as represented in the illustration. This will expose a little point, under which the finger nail can be slipped and pulled open until the latch clears the joint B, when the gate part or swivel C should be swung to one side. Keys may then be put on or removed instantly, saving time, fingers and annoyance. Attention is drawn by the company to the security afforded by the positive lock and the ease with which keys may be added or removed from the ring.

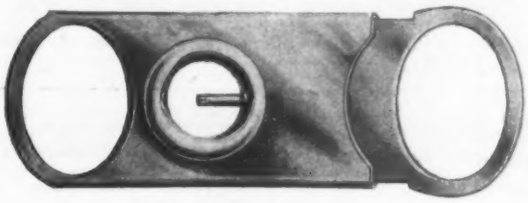


Locking Key Ring.

Olsen & Johnson, Hardware and Implements, Troy, Idaho, are building an addition to their store building to accommodate a stock of Crockery and Glassware, which will be added.

Willis Cigar Perforator.

The New Jersey Aluminum Company, Springfield avenue, Newark, N. J., and New York office 150 Nassau street, of which H. M. Willis is manager, has just brought out the Willis cigar perforator here shown actual size. The purpose of this device is to perforate the mouth end of the cigar so that there is no clogging, tearing of wrapper, crushing of cigar nor portion of filler drawn into the mouth, at the same time, it is said, giving a better draft and spreading and cooling the smoke. The perforator



Willis Cigar Perforator.

removes the tobacco clean from the perforation, leaving the cigar otherwise intact. In use the pointed end of a cigar is pressed into the opening or nipple, 5-16 in. in diameter, and the perforator pushed through the material. If extra draft is desired the cigar may be turned quarter way and the operation repeated. The device is made of German silver and the movable member has a play of 7-16 in.

Universal Lever Cork Extractor.

The Snow & Petrelli Mfg. Company, New Haven, Conn., for which John H. Graham & Co., 113 Chambers street, New York, are sole distributers, has put on the market the Universal lever cork extractor here illustrated. The extractor is suitable for carrying conveniently in the pocket, being but 3½ in. long, folded, and weighing 1¾ oz. The three parts are formed from wrought steel and nickeled. In use the worm screw is inserted in the cork and by means of the pivoted lever to be held against neck of bottle for a fulcrum, as seen in Fig. 2, the most stubborn cork can be easily drawn without tugging or straining, by a downward pressure on handle. Tin caps on corks are qrickly removed by placing the loop of handle on top of cap and end of plate under the crimped edge, when with an upward lift the cap is thrown off. Where corks are secured by wires the extractor is held with curved plate underneath, when a slight pressure

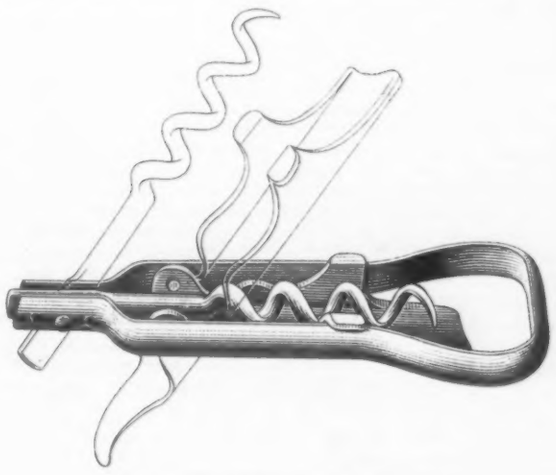


Fig. 1.—Universal Lever Cork Extractor.

lowers the hook, which is then inserted under the wire and with a twist horizontally to the right the wire is

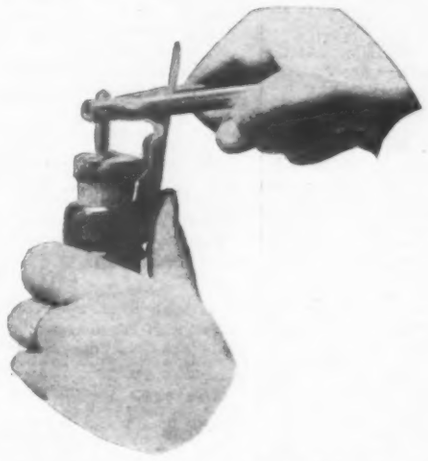


Fig. 2.—Process of Extracting Cork.

cut. Foil caps may also be cut and removed with the hook.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	₱ gal.	
Linseed, City, raw	.38	@39
City, Boiled	.39	@40
State and Western, raw	.37	@38
Raw Calcutta, in bbls		@..
Lard, Extra Prime, Winter	.69	@70
Extra No. 1	.46	@47
No. 1	.40	@44
Cotton-seed, Crude, f.o.b. mills	.22½	@25
Summer Yellow, Prime	.37½	@38
Summer Yellow, off grades		@..
Sperm, Crude	.53	@..
Natural Spring		@..
Bleached Spring		@..
Natural Winter	.63	@65
Bleached Winter	.66	@67
Bleached Winter, Extra	.68	@69
Tallow, Prime	.51	@53
Whale, Crude	.32	@33
Natural Winter	.43	@44
Bleached Winter	.45	@46
Extra Bleached Winter	.47	@48
Menhaden, Brown, Strained	.26	@29
Light, Strained	.27	@30
Bleached, Winter		@..
Extra Bleached, Winter		@..
Southern	.21	@..
Cocoanut, Ceylon	₱ lb 8¼	@..
Cochin	₱ lb 9	@ 9½
Cod, Domestic, Prime	.30	@33
Newfoundland	.35	@37
Red, Elaine	.37	@42
Red, Saponified	₱ lb 4¾	@ 5
Olive, Italian, bbls	.56	@57
Neatsfoot, Prime	.48	@49
Palm, Logos	₱ lb 6½	@ 6 4-10

Mineral Oils—

Black, 29 gravity, 25@30 cold test	₱ gal.	10½@11½
29 gravity, 15 cold test		11½@12½
Summer		10½@11½
Cylinder, light filtered	.18	@19
Dark filtered	.16	@17
Paraffine, 903-907 gravity		13½@14
903 gravity		12½@13
883 gravity		10¼@10¾
Red		12½@14

Miscellaneous—

Barytes:		
White, Foreign	₱ ton	$18.50@20.00
Amer. floated	₱ ton	19.00@.....
Off color, No. 2	₱ ton	14.00@15.50
Chalk, in bulk	₱ ton	3.00@ 3.25
In bbls	₱ 100 lb	....@ .35
China Clay, English	₱ ton	11.00@17.00
Cobalt, Oxide	₱ 100 lb	2.50@ 2.60
Whiting, Commercial	₱ 100 lb	.43@ .48
Gilders	₱ 100 lb	.50@ .55
Ex. Gilders	₱ 100 lb	.55@ .60

Putty, Commercial—₱ 100 lb

In bladders	$1.70	@1.85
In bbls. or tubs	1.20	@1.40
In 1 lb to 5 lb cans	2.65	@2.95
In 12½ to 50 lb cans	1.50	@1.70

Spirits Turpentine—₱ gal.

In Oil bbls	67½	@68
In machine bbls	68	@68½

Glue—

	₱ lb	
Cabinet	.11	@15
Common Bone	.7	@ 9
Extra White	.18	@24
Foot Stock, White	.11	@14
Foot Stock, Brown	.8	@11
German Hide	.12	@18
French	.10	@40
Irish	.13	@16
Low Grade	.9	@12
Medium White	.14	@17

Gum Shellac—

	₱ lb	
Bleached Commercial	.47	@47½
Bones, Dried	.57	@59
Button	.40	@50
Diamond I	.53	@55
Fine Orange	.50	@52
A. C. Garnet	.47	@47½
Kala Button	.37	@38
G. A. L. Garnet	.45	@45½
D. C	.55	@58
Octagon, B		@52
T. N		@50
V. S. O	.54	@55

Colors in Oil—

	₱ lb	
Black, Lampblack	.12	@14
Blue, Chinese	.36	@46
Blue, Prussian	.32	@36
Blue, Ultramarine	.13	@16
Brown, Vandyke	.11	@14
Green, Chrome	.12	@16
Green, Paris		@24
Sienna, Raw	.12	@15
Sienna, Burnt	.12	@15
Umber, Raw	.11	@14
Umber, Burnt	.11	@14

White Lead, Zinc, &c.—

	₱ lb	
Lead, English white, in Oil	9¾	@10
Lead, American white, in Oil:		
Lots of 500 lb or over		@ 7¼
Lots less than 500 lb		@ 7¾
In Barrels		@ 6¾
Lead, White, in oil, 25 lb tin pails, add to keg price		@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price		@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price		@ 1½
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	₱ lb.	
Lead, White, Dry, in bbls	6¼	@6¾
Zinc, American, dry	5¾	@5½
Zinc, French:		
Antwerp, Red Seal, dry		8¾
Antwerp, Green Seal, dry		10¾
Paris, Red Seal, dry		9¾
Paris, Green Seal, dry		11
Zinc, V. M. French, in Poppy Oil:		
Green Seal:		
Lots of 1 ton and over	13¼	@13¾
Lots of less than 1 ton	13¾	@13¾
Zinc, V. M. French, in Poppy Oil:		
Red Seal:		
Lots of 1 ton and over	11¾	@12¾
Lots of less than 1 ton	12¼	@12¾

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb	
Black, Carbon	.5	@10
Black Drop, American	.4	@ 6
Black Drop, English	.5	@15
Black, Ivory	.16	@20
Lamp, Coal		4½@ 6
Blue, Celestial	.4	@ 6
Blue, Chinese	.29	@32
Blue, Prussian	.27	@30
Blue, Ultramarine		4½@15
Brown, Spanish		½@ 1
Carmine, No. 40		$2.90@3.00
Green, Chrome, ordinary		3½@ 6
Green, Chrome, pure	.17	@25
Lead, Red, bbls., ½ bbls. and kegs:		
Lots 500 lb or over		@ 7¼
Lots less than 500 lb		@ 7¾
Litharge, American, bbls		7¼@ 7¾
Ocher, American	₱ ton	$8.50@16.00
American Golden		2½@ 3½
French		1¼@ 2½
Foreign Golden		3 @ 4
Orange Mineral, English	.10	@12
French		10¾@12
German		8½@10
American		8½@ 8¾
Red, Indian, English		4½@ 8½
American		3 @ 3¼
Red, Turkey, English	.4	@10
Red, Tuscan, English	.7	@10
Red, Venetian, Amer.	₱ 100 lb	$0.50@1.25
English	100 lb	$1.15@1.75
Sienna, Italian, Burnt and Powdered	.3	@ 9½
Italian, Raw, Powdered	.3	@ 6½
American, Raw		1½@ 2
American Burnt and Pow		1½@ 2
Talc, French	₱ ton	$17.00@25.00
American	₱ ton	17.00@25.00
Terra Alba, French	₱ 100 lb	.90@ 1.00
English	₱ 100 lb	.80@ 1.00
American	₱ 100 lb, No. 1	.75@ .80
American	₱ 100 lb, No. 2	.60@ .65
Umber, Turk., Burnt & Pow		2½@ 3½
Turkey, Raw and Powdered		2½@ 3½
Burnt, American		1½@ 2
Raw, American		1½@ 2
Yellow Chrome	.12	@14
Vermilion, American Lead	.10	@25
Quicksilver, bulk	.65	@..
Quicksilver, bags		@65
English, Import	.65	@70
Chinese		$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ₱ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—
See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils.....₱ lb 7 @7¼¢
Har-Budden, Wrought.....9½@9¾¢
Trenton .....₱ lb 9½@9¾¢

Imported—
Peter Wright & Sons, ₱ lb, 84 to 349 lb. 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers—
See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur.....75@75&5%
Jennings' Pats., reg. finish.....50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₱ doz. $36; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $36.00.....70&10%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—
Ship Augers.....45&5@—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—
See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.68@70¢
Peg Awls:
Unhandled, Patent..gro. $1@2¼¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—
See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights:
First Quality.....$1.75@5.00
Second Quality.....$1.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—
See *Grease, Axle*

Axles—
Iron or Steel
Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...5¼@5¾¢
No. 1½ Com., New Style5¾@4¼¢
No. 2 Solid Collar.....4¼@4½¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb., 8½@9¢

Bait—
See *Fishing—*

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—
See *Sash—*

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—
Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50&10%
Straight Balances.....40@50%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—
See *Wire, Barb.*

Bars—
See *Crow—*

Steel Crowbars, 10 to 40 lb.... per lb., 3@3½¢

Towel
No. 10 Ideal, Nickel Plate..₱ gro. $3.50

Beams, Scale—
Scale Beams.....40&10@50%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 13 Wire Tinned ₱ doz.....$0.75
No. 12 Wire Coppered ₱ doz, $0.75; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..₱ doz. $1.50
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, per doz., No. 5, $0.80; No. 1, Jap'd, $1.15; No. 1, Tin'd, $1.40; No. B, Jap'd, $1.85; No. 2, Tin'd, $2.25; No. 2, Jap'd, $1.35; No. 6, $1.60.
Lyon, Jap'd, per doz., No. 2, $1.35; No. 3, $1.50.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (R M, Co.)..₱ gro. net, $6.25

Bellows—
Blacksmith, Standard List.. 60&10@60&10&5%

Hand—
Inch..	6	7	8	9	10
Doz...	$4.75	5.70	6.65	7.60	8.55

Molders—
Inch..	9	10	11	12	14
Doz...	$8.00	9.00	10.50	12.50	14.50

Net Prices.

Bells—
See *Cow—*

Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....60%

Door—
Abbe's Gong.....45%
Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Trip Gong.....50&10@60&10&5%
Yankee Gong.....55%

Hand—
Polished, Brass.....60&10%
White Metal.....60%
Nickel Plated.....50&10@60%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—
Farm Bells.....lb., 2¼@2½¢
Church and School.....60%
American Tube & Stamping Co. Gongs 10%
Table Call Bells.....50@50&10%

Belting—
See *Leather—*

Extra Heavy, Short Lap..65&5%
Regular Short Lap....60&10&5%
Standard 10%
Light Standard.....70&5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1906 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—
See *Tackle—*

Common Wooden.....75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal, Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c.....40%
Paper Embossed.....40&10%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....88⅓%

Bolts—
Carriage, Machine, &c.—
Common Carriage (cut thread): ⅝ × 6 and smaller.....75@—%
Larger and Longer..... 60&10@60&10&5%
Phila. Eagle,$3.00 list May 24,'99 40%
Bolt Ends.....65@65&5%
Machine, ⅝ x 4 and smaller.. 75@—%
Machine, larger and longer.. 65@65&5%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:

Inch.....	3	4	5	6	8
Per doz.$1.30	.35	.45	.60	.80	

Cast Iron Spring Foot, Jap'd:

Inch.....	6	8	10
Per doz.....$1.20	1.50	2.25	

Cast Iron Chain, Flat, Japanned:

Inch.....	6	8	10
Per doz.....$1.00	1.40	1.65	

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch.....	6	8	10
Per doz.....$0.75	.95	1.25	

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....50@50&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square ...66⅔&10@66⅔&10&10%
Ives' Patent Door.....50%

Plow and Stove—
Plow .....65&10@—
Stove .....82½&10

Tire—
Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84....80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:

Inch.....	1¼	1½	1¾	2
Per doz...	$4.80	5.60	6.40	8.00
Inch	2¼	2½		
Per doz.....	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65@$1.75; No. 3, $2.50 each...25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20&10%; Langton Acme .....15&10%
Perfection 40%
Seavey 40%
Stanley R. & L. Co.: Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—
Common Ball, American, $1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet 60%
Mayhew's Quick Action Hay Pat....50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—
Wrought Steel...80&10@80&10&5%
Griffin's Pressed Steel.....80@80&10%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink...50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
Price per dozen.

Quart.....	10	12	14
Water, Regular...	1.40	1.70	1.90
Water, Heavy....	3.40	3.70	3.80
Fire, Rd. Bottom..	2.30	2.55	2.95
Well	2.55	2.87	3.15

Bucks, Saw—
Hoosier.....₱ gro. $36.00

Bull Rings—
See *Rings, Bull*

Butts—
Brass—
Wrought, list, Sept., '96..15@—%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—
Discount.

Reversible and Broad..75&5%
Light Reversible, Light Narrow .....75&10%
Loose Joint, Narrow, L'ht Inside Blind, etc.....75%
Back Flaps, Table, Chest. .....70&10%

Extra, 10&10%

Cages, Bird—
Hendryx Brass: Series 2000, 5000, 1100, 5%; 1200, 33⅓%; 200, 300, 600, 900 .....40&10%
Hendryx Bronze: Series 700, 800..... 40&10%
Hendryx Enameled.....40&10%

Calipers—
See *Compasses.*

Calks, Toe and Heel—
Blunt, 1 prong.....per lb. 4@5¼¢
Sharp, 1 prong...per lb., 4¼@5¼¢
Burke's Blunt, 4@4¼¢; Sharp 4½@4¾¢

Gautier, Blunt, 4@4¼¢; Sharp 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern	$1.35	1.85	2.05	each.
New York Pattern	1.50	2.20	2.45	each.
Baltimore Pattern	1.50	2.20	2.45	each.
Dubuque	1.35	1.60	1.75	each.

Cans, Oil—
Buffalo Family Oil Cans:

3	5	10 gal.	
$18.00	60.00	129.60	gro., net.

Caps, Percussion—
Eley's E. B......55@55¢
G. D......per M 34@35¢
F. L......per M 40@42¢
G. E......per M 48@50¢
Musket.....per M 62@63¢

Primers—
Berdan Primers, $2 per M...80%
B. L. Caps (Sturtevant Shells) $2 per M.....80%
All other primers per M.$1.52@1.60

Cartridges—
Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd.$1.90
B. B. Caps, Round Ball....$1.40
Central Fire.....85%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—
Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....35%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—
American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$8.70	5.90	4.95	4.20	4.05	3.95	3.90
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.			
$3.85	3.70	3.65	3.80			

German Coil.....60&10&10@70%

Halter—
Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2½, '97.....60&10&10%
Covert Mfg. Co.
Halter.....35&5%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—
Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$25.00
6½—6-2, Str'ght, with ring.$26.00
6½—8-2, Str'ght, with ring.$30.00
6½—10-2, Str'ght, with ring.$35.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c......60&10%

Miscellaneous—
Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....60&10%
Safety Chain.....70&10%
Gal. Pump Chain.....lb. 4@4½%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
Am. Dog Leads and Kennel Chains, 40@40&5%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—
Oneida Community:
Copper Chain, 60&5%; Steel Chain, 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set .8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)
Carpenters' Blue....gro., 45@—¢
Carpenters' Red.....gro., 40@—¢
Carpenters' White...gro., 35@—¢
Some jobbers sell at lower prices than above.

Checks, Door—
Barlis'ey's.....35%
Pullman, per gro.....$54.00
Russw'n.....40%

Chests, Tool—
American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters,' etc., Chests with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....30%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—
Socket Framing and Firmer
Standard List...75&10@75&10&5%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....75%
L. & I. J. White Co.....30@30&5%

Tanged—
Tanged Firmers.....33 1-3@40%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold— lb.
Cold Chisels, good quality..18@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—
Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck....35%
Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks....40&10%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat., 25%; Positive Drive.....33⅓%
Planer Chucks.....30%
Face Plate Jaws.....40&10%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..35%
Independent Iron, Nos. 18 and 318.40%
Independent Steel, No. 64.....30%
Union Czar Drill, Nos, 000, 101, 103.....35%
Universal 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and 72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—
Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—
Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—
Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—
Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—
Chicago Flexible Shaft Company:
'98 Chicago Horse, each....$8.75
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
} 30%

Clips, Axle—
Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire
—See *Wire, &c.*

Cocks, Brass—
Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....70%
Compression Bibbs.....65&10%

Coffee Mills—
See *Mills, Coffee.*

Collars, Dog—
Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—
Metal Stamping Co.....40%

Compasses, Dividers, &c.
Ordinary Goods.....70&10@75%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double, 65%; Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....60%
Lodi Dividers.....75%

Conductor Pipe,—
L. C. L. to Dealers:

Territory:	*Galvanized Galv. Steel.*	*Charcoal Iron.*	*Copper. 1½, 16&20 oz.*
Eastern:			
	60&30%	60&2½%	40&10%
Central:			
	70%	55&7½%	40&7½%
Western and Southern:			
	65&10%	55&2½%	40&5%
So. Western			
	63½&7½%	50&5%	40&2½%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador ...	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea..	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled, 25%; Agate Lined, 25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—
Soldering Coppers, 3 lbs. to pair and heavier, 23¢; lighter than 3 lb. to pair.....25¢

Cord— Sash—
Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 2½¢; No. 7, 2½¢; No. 6, 2½¢.
Cable Laid Italian.....lb., *A*, 18¢; *B*, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted..17@19¢
Patent Russia.....lb. ..@14¢
Cable Laid Russia....lb. ..@15¢
India Hemp, Br'd'd..lb. 18@18½¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted.lb. 12@13¢
Anniston Cordage Co.: ℔ lb, solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.21½; No. 6, $0.25½; ℔ doz., 50 ft., Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ℔ lb, 25½¢; No. 7, 25¢; Nos. 8 to 12, 24½¢
Eddystone Braided, Nos. 8, 9 and 10, 25¢; 7, 25½¢; 6, 26½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....℔ lb 23 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, per lb., Drab Cotton, 40¢; Italian Hemp, 40¢; Linen, 55¢; White Cotton or Spot....35 ¢
Massachusetts, White.....℔ lb 30 ¢
Massachusetts, Drab.....℔ lb 35 ¢
Phoenix, White, Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—
List July 10, 1906...85&10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%

Cradles—
Grain.....40&12½%

Crayons—
White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber.....℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—
Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—
Victor Garden.....50%

Cutlery, Table—
International Silver Company:
No. 12 M'd'm Knives, 1847.℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters— Glass—
H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—
American.....30%

Nos.	1	2	3	4	5	6
Each	$5	$7	$10	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$8

25@25&7½%
No. 202, $1.50.....40&7½%
Dixon's.....℔ doz. 40@50%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant.....℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ℔ doz. $24.00.....40@50%
Ruswin Food. No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....℔ doz. 40@50%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—
Henry Disston & Sons:
Slaw and Kraut Cutters, Corn Graters, &c.....35%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater.....℔ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..℔ gr. $18@$20
Slaw Cutters, 2 Knife..℔ gr. $22@$30

Tobacco—
All Iron, Cheap..*doz. $4.25@$4.50*
Enterprise.....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—
Dalber Post Hole Auger..per doz., $9.00
Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ℔ doz., $6.25
Perfection Post Hole Diggers, ℔ doz.....$8.25
Split Handle Post Hole Diggers, ℔ doz. $7.25
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ℔ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawers, Money—
Tucker's Pat. Alarm Till No. 1, ℔ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—
Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—
Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Point's.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's, 40%; Weston's..40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—
Bit Stock.....60&10&10@70%
Taper and Straight Shank.....60&10@60&10&5%

Drivers, Screw—
Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2¼-in., $6; 4-in., $7.50; 6-in., $9.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....50&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn, Handles, 65%; No. 66, 75%; Victor, 55%; Defiance..70%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized Galv. Charcoal Copper. Steel. Iron. 1½, 16&20 oz.*
Eastern:	
80%	70&5% 40&10%
Central:	
75&10&7½%	70% 40&7½%
Western and Southern:	
70&20&7½%	60&15&2½% 40&5%
So. Western:	
70&20%	65&2½% 40&2½%

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—
Factory shipments, all territories:
Galv. Steel and Galv. C. I.
Standard Gauge.....60&10%
No. 26.....50%
No. 24.....25%
No. 22.....10%
Copper.....50%

Elbows, Stove Pipe—
Dover, one piece (R. M. Co.)....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	¼ to ½:	½ to 220:	Flour.
Kegs.....lb.	5 ¢	5½ ¢	5½ ¢
½ Kegs.....lb.	5¼ ¢	5¾ ¢	5¾ ¢
¼ Kegs.....lb.	5½ ¢	6 ¢	6 ¢
10-lb. cans, 10 in case....6½ ¢	7 ¢	6 ¢	
10-lb. cans, less than 10.....	10 ¢	10 ¢	8 ¢
Less quantity..	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

Fasteners, Blind—See *Squeezers, Lemon.*

Zimmerman's .....50&10%
Walling's .....40&10%

Cord and Weight—

Ives 33⅓%

Faucets—

Cork Lined.....50@50&10%
Metallic Key, Leather Lined..
60&10@70%
Red Cedar.....40&10@50%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined..50%
John Sommer's Reliable Cork Lined..
50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ₩ doz. $36.00.....40&10%
Lane's, ₩ doz. $36.00.....40&10%
National Measuring, ₩ doz. $36.40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List revised Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 2⅛, '97.....33 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz	*$3.25*	*3.75*	*4.25*	*4.75*

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Stowell's Giant Grindstone Hanger..
₩ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 50&10%; Light.....60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato.....50&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz..75@80¢
Red, S'g't Bar, per doz...$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.30*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—

	Per 1000 Feet.	
Hemp	$2.75	10&2½%
Cotton	3.20	
Waterproof. Sgl. Taped..	3.65	
Waterproof Dbl. Taped..	4.40	
Waterproof Tpl. Taped..	5.15	

Gates, Molasses and Oil—

Stebbins' Pattern.....80&10%

Gauges—

Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Disston's Marking, Mortise, &c..67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....60%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....33⅓%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush..
25&10@50%
International Glue Co. (Martin's)..40%

Grease, Axle—

Common Grade....gro. $4.50@6.00
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ₩ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ₩ doz.....$2.00 } 33⅓%
Pike Mower and Tool Grinder, each .....$6.00 }

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Halters and Ties—

Cow Ties.....60&10@60&10&5%
Covert Mfg. Co.:
Web 45%
Jute Rope.....45%
Sisal Rope.....33⅓%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
Plumb, A. E. Nail.....
33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand.....
50&7½&5@50&10&7½&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....
40&2½@40&10&2½%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢....80&10%
Over 5 lb., per lb., 30¢..80&10&10%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....45@50%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50%
D Handles.....50@50&5%

Cross-Cut Saw Handles—

Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted...gro. $2.50@$3.00
Brad Awl.....gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@$1.95; Hickory.....$1.45@$1.60
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.....
₩ gro. $0.85@$1.50

Hangers—

NOTE—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction 75%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard.....60&5%
Hinged.....net $6.40
Covered .....60&2%
Special .....70&5%
Lawrence Bros.:
Advance and Sterling.....60&10%
Cleveland and Peerless.....75%
Clipper, No. 75.....60%
Crown .....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant .....60&5%
Hummer .....70&5%
New York.....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track No. 3. $2.00
Ball B'r'g St'l Track No. 10.50&10%
Roller B'r'g St'l Track No. 12.$2.15
Roller B'r'g St'l Track No. 13.$2.30
Roller B'r'g, Nos. 39, 41, 43, 70&10%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&10%
Trolley B, D. No. 17, $1.25; F. D. No. 120, $2.10; No. 121, $2.25; No. 150.....$2.35
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&10%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.00
Trolley B, D, No. 20.....50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43; 44, Sizes 1 and 2..70&10%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60&10%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas, 60%; Freight Car Door, 60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator 40%
Express 50%
Interstate .....60&10%
Laundry Parlor Door.....50&10%
Magic, 60%; Rex Hinge Door, 60%
Matchless .....60&10%
Nansen .....70&5%
Parlor Door, 50&10%; Railroad, 50&10%
Street Car Door.....50%
Steel, Nos. 300, 491, 500....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle.....70%
Climax Anti-Friction.....50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%

Extra 5&10% often given.

Hangers— Garment—

Pullman Trouser, ₩ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.00; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $15.00; Garment Hanger Loops, Round Nickeled, per gro.....$15.00
Victor Folding.....₩ gro. $9.60
Western, W. G. Co.....70&10%

Gate—

Myers' Patent Gate Hangers, ₩ doz. net $4.50

Joist and Timber—

Lane Bros. Co.....30%

Hasps—

Griffin's Security Hasp.....50%
McKinney's Perfect Hasp, ₩ doz..50%

Hatchets—

Regular list, first quality....50%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 9E, $3.25; No. 1, $3.50.....15%
Clark Coal, ₩ doz. $0.75.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, ₩ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.....75&10&5%
Tip Pat'n, Nos. 1, 3 & 5...75&10&5%
Buffalo Gravity Lockir Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L'f'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....doz. ....@$2.00
Without Latch...doz. ....@$1.60
Reversible Self-Closing:
With Latch.....doz. ....@$1.75
Without Latch...doz. ....@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets.

Nos.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges

Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—

Holdback, Cast Iron...$6.50@$7.00
Non-Holdback, Cast Iron$5.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor..40%
Bommer Spring Hinges.....40%
No. 999 Wrot. Steel Hold Back, ₩ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor..50%
Garden City Engine House...125%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ₩ gr., No. 14, $8.00; No. 18, $25.00
Columbia, Adj., No. 7, ₩ gr. $12.00
Gem, new list.....30%
Clover Leaf.....₩ gr. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Lawson Mfg. Co. Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₩ gr. $9.00
Ball Bearing Floor Hinge....50%
Ohio Detachable Screen Door Hinge .....₩ gr. $12.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₩ gr. $12.50
Ideal, No. 4.....₩ gr. $9.00
New Idea No. 1.....₩ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb'k.₩ gro. pr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges...65%
Heavy Strap Hinges..75%
Light T Hinges.....60%
Heavy T Hinges.....55%
Extra H'y T Hinges..70%
Hinge Hasps.....15%
Cor. Heavy Strap....75%
Cor. Ex. Heavy T..70&10%

Extra, 10&5&10%

Screw Hook and Strap. { *6 to 12 in.* ..lb. 3¾¢ / *1½ to 20 in.* ..lb. 3½¢ / *22 to 36 in.* ..lb. 3¼¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2½

Hods— Coal—
Per doz.

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$2.50*	*2.75*	*3.00*	*3.25*
Jap. Open	*$1.90*	*2.10*	*2.25*	*2.35*
Galv. Funnel	*$3.00*	*3.30*	*3.60*	*3.90*
Jap. Funnel	*$2.45*	*2.65*	*2.85*	*3.05*

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $0.95
Steel Mortar, No. 158.....each $1.25

Hoes— Eye—
Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding No. 1, $2.00; No. 2, $2.25
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 60%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe..₱ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&2½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱ doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ₱ doz. $24.00.....45&10%

Door—
Bardsley's.....45%
Empire.....50%
Pullman.....60%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—
Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80&10@..%
Wire C. & H. Hooks:.....
75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King..70&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $3.50.
Cotton.....*dos. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—
Hooks, Bench, see Stops, Bench.
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz......*$1.30*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....*60&5@60&10&5%*
Malleable Iron.....*70@70&10%*
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....*ft. 5 @ 6 ¢*
3-ply Guaranteed..*ft. 8 @ 9 ¢*
4-ply Guaranteed..*ft. 10 @11 ¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8 @ 9 ¢*
Fair Quality.....*ft. 10 @11 ¢*

Irons— Sad—
From ½ to 10.....*lb. 3 @3½¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

Nos.	*50*	*55*	*60*	*65*
Jap'd Tops	*65*	*62*	*75*	*72*
Tin'd Tops	*70*	*67*	*80*	*77*

New England Pressing..*lb. 3¾@4¢*

Pinking—
Pinking Irons.....*doz. 60¢*

Irons, Soldering
See *Coppers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—
Wilkinson Wilcut Brand Knives and Hooks.....60%
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....*75&5@75&10%*
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Swan's.....75%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz. $5.75@6.00
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Mincing—
Buffalo.....₱ gro. $13.00

Miscellaneous—
Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..*doz. $2.05@2.15*
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%

Lanterns—Tubular—
Regular Tubular, No. 0.....
doz. $4.25@4.50
Lift Tubular, No. 0.....
doz. $4.75@5.00
Hinge Tubular, No. 0.....
doz. $4.75@5.00
Other Styles.....*40@40&5%*

Bull's Eye Police—
No. 1, 2¾-inch.....*$2.75@3.00*
No. 2, 3-inch.....*$3.00@3.25*

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw..
doz. 35@40¢

Door—
Allith Mfg. Co., Automatic, No. 400 ₱ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, Hemp and Jute, 45%; Sisal, 33⅓%.

Lifters, Transom—
R. & E.....33⅓%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.25*	*2.00*	*1.75*
75 feet	*$1.75*	*1.35*	*1.10*

Anniston Waterproof Clothes, 50 ft., ₱ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3/4, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3/4, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3/4, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%

Locks— Cabinet—
Cabinet Locks...*33⅓@33⅓&7½%*

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron....*75&10&5@80&5%*
Net prices are general.
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40&20%; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33⅓%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..25%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers, *$2.00@2.25*
Com. Angl'r, without Augers, *$2.25@2.50*
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....35&5%
Millers' Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—
Reisinger Invincible Hand Power.....
₱ doz. $18.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—
Chandler's.....12½%

Washing—
Boss Washing Machine Co.: Per doz.
Boss No. 1.....$57.00
Boss Rotary.....$54.00
Champion Rotary Banner No. 1..$54.00
Standard Champion No. 1.....$48.00
Standard Perfection.....$26.00
Cint' Square Western.....$30.00
Unseda American, Round.....$30.00

Mallets—
Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Apple-wood.....*doz. 45&5@50%*

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list..
50&10%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria..50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel....70&10&10&5%
Style B, Low Wheel.....70&10&5%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M, S, C, K, T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—
Wire Nails and Brads, Miscellaneous.....*85&10@85&10&5%*
Cut and Wire, See Trade Report.
Hungarian, Finishing, Upholsterers' &c. See Tacks.

Horse—

Nos.	*6*	*7*	*8*	*9*	*10*	
Anchor	23	21	20	19	18	...40&5%
Champlain	26	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%

Western.....₱ lb 8½¢
Jobbers' Special Brands.....
per lb. 9@10¢

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—
See *Pliers and Nippers.*

Nuts—
Cold Punched: *Off list.*
Square, Blank or Tapped..
4.80@4.90¢
Hexagon, Blank or Tapped..
5.20@5.30¢
Square, Blank, C. & T.5.10@5.20¢
Hexagon, Blank, C. & T...
5.80@5.90¢
Hot Pressed:
Square, Blank.....*5.60@5.10¢*
Hexagon, Blank.....*5.40@5.50¢*
Square, Tapped.....*4.90@5.00¢*
Hexagon, Tapped....*5.30@5.40¢*

Oakum—
Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum.....*8½¢*
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10&5@70%*
Zinc.....*65&10&5@70%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Tin or Steel.....*65&10%*
Zinc.....*65&10%*
Malleable, Hammers' Imp'ed, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70&10&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
National.....50&10%
Stowell's Sprague.....₱ doz. 35@45¢
Vim Tin Shear and Can Opener, ₱ doz., 75c.; per gro., $7.50

Egg—
Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....*17@22¢*

Rubber—
(Fair quality goods.)
Sheet, C. I......*11@12¢*
Sheet, C. O. S......*11@12¢*
Sheet, C. B. S......*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₱ lb 80¢.....25@25&5%

Miscellaneous—
American Packing...*lb. 7@10 ¢*
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Creamery—
R. M. Co., with gauges—No. 1, $6.25; No. 2, $6.50 ₱ doz.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....*65&10%*

Fry—
Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Roasting and Baking—
Regal, R. M. Co., ₱ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory ₱ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos:	*lb.*	
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	*6¢*	32
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lbs., per 100 sq. ft.	*8¢*	1-32
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	*7¢*	

Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll
40@50¢
Medium weight, 30 lbs. to roll
50@55¢
Heavy weight, 40 lbs. to roll
65@70¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4¼ sq. ft. to lb. ton.....*$50.00*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—
1 ply (roll 400 sq. ft.), ton.....
$31.00@$35.00
2 ply, roll 108 sq. ft.....*57¢*
3 ply, roll 108 sq. ft.....*80¢*
Slater's Felt (roll 500 sq. ft.).76¢

Sand and Emery—
Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth...*2?%*
Emery Paper and Cl'h..50&10@60%

Parers— Apple—
Advance.....₱ doz. $4.00
Baldwin.....₱ doz. $4.00
Bonanza Improved.....each $6.50
Daisy.....₱ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
Little Star.....₱ doz. $8.00
New Lightning.....₱ doz. $7.00
Reading 72.....₱ doz. $7.00

Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $6.20
Turn Table '96.....℔ doz. $6.00
White Mountain.....℔ doz. $5.00

Potato—

Saratoga.....℔ doz. $7.00
White Mountain.....℔ doz. $6.00

Picks and Mattocks—

List, Feb. 23, 1899.....75@75&5%
Cronk's Handled Garden Mattock, ℔ doz., $6.40.....33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass.....50&10@60%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in..50&10@50&10&5%
Extra Heavy, 2-6 in......65&10%
Fittings.....70&10@70&10&5%

Pipe, Merchant—

Consumers, Carloads.

	Steel. Blk.	Steel. Galv.	Iron. Blk.	Iron. Galv.
⅛ & ¼ in.	71%	55%	68%	52 %
⅜ in.	73%	59%	70%	56 %
½ in.	75%	63%	72%	60 %
¾ to 6 in.	79%	69%	76½%	66⅔%
7 to 12 in.	74%	59%	71½%	56 %

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class.....85@86%
Second-class.....90%
NOTE.—Market irregular.

Pipe, Stove—

Edwards' Nested:	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual......35@35&10%
Bench, second qual...45@45&10%
Molding.....30@30&10%
Bailey's (Stanley R. & L. Co.).....40%
Chapin-Stephens Co.:
Bench, First Quality.....35%
Bench, Second Quality.....45%
Molding and Miscellaneous.....30%
Toy and German.....35%
Chaplin's.....60%
Union.....60%

Iron Planes—

Bailey's (Stanley R. & L. Co.).....40%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....35%
Union.....60%

Plane Irons—

Wood Bench Plane Irons.....25@25&10%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Stanley R. & L. Co.....35%
Union.....50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.50

Plates—

Felloe.....*lb.* 4@4¼¢
Self-Sealing Pie Plates (R. M. Co.), ℔ doz. $2.00.....50%

Pliers and Nippers—

Button Pliers....75&10@75, 10, 5%
Gas Burner, per doz., 6 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&10@40&10&10%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....40%
P., S. & W. Tinners' Cutting Nippers.....40%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Lodi, 50%; Paragon, 50%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&5%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10&5%
Extension Sights.....30@30&10&5%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels.....67½%
Disston's Pocket Levels.....67½%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable.....40&7½%
Stanley R. & L. Co.....33⅓%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers.....*lb.* 9¢
½-lb. papers.....*lb.* 9@10½¢
¼-lb. papers.....*lb.* 9½@11¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's.....25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72....40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside.....℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese.....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans, ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....*gro. $8.00*
1 qt., Round.....*gro. $9.00*
1½ qt., Square.....*gro. $10.00*
2 qt., Square.....*gro. $12.00*

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb.....*each 45¢*
Fine Sporting, 1 lb....*each 75¢*
Rifle, ½-lb.....*each 15¢*
Rifle, 1-lb.....*each 25¢*
In Kegs:
12½-lb. kegs.....*$3.50*
25-lb. kegs.....*$4.50*
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail—

Cyclops.....50%
Miller's Falls, No. 3, ℔ doz., $12.00.....33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00.....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., No. 2, $6.00; No. 3, $5.50.
Giant No. 1, ℔ doz. $12; No. 2, $16.50; No. 3, $15.....33⅓%
Staple Pullers.....60%
Parrot Tack and Stub Puller, ℔ doz. 75c.; ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., ¾ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.25	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....*16@18¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....*17@19¢*
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 1, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal.....70&10%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern.....60@60&10%
Pitcher Spout.....80@80&10%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list).....50%
Barnes' Pitcher Spout.....75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.75
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list).....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co., Measuring, $6.00.....30%
Mechanical Sprayer.....$6.00
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good.....*doz. 50@75¢*
Spring, single tube, good quality.....*$1.75@2.00*
Revolving (4 tubes).....*doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Bernard.....33⅓%
Lodi, 50%; Paragon.....50%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co...40%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.....*2½@2¾¢*
Sliding Door, Wrought Brass, 1¼ in., lb., 36¢.....30%
Allith Mfg. Co.: Reliable Hanger Track.....50%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $4.10.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard.....℔ ft. 4¢
Myers' Stayon Track.....60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail.....℔ ft. 1¾¢
Steel Rail, Plain.....22%
Wrought Bracket, 1 3-16 in., ℔ ft. 3¢
Wrought Bracket, 1¼ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $2.75

Rakes—

NOTE.—Many goods are sold at net prices.

Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00...75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.....60%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60.....net.
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Kohler's:
Lawn Queen, 20-tooth.....℔ doz. $3.45
Lawn Queen, 24-tooth.....℔ doz. $3.60
Paragon, 20-tooth.....℔ doz. $2.75
Paragon, 24-tooth.....℔ doz. $3.00
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.'.....70&5@70&10&5%
McCaffrey's American St'd...60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

Boker—I. C.....60%
Fox Razors, ℔ doz., No. 42, $20.00; No. 44, $20.00; No. 82, Platina, $25.00. } Discount
Red Devil.....50%
Silberstein:
Carbo Magnetic, $18.00; Griffon, No. 65, $15.00; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—

Kampfe Bros.:
Star Safety, 25%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein.....40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze..25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 28 PN.....20%
2904 P, 33⅓%; 2904 PN, 33⅓%; 0924 N, 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed.....70%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal, 40&10%

Revolvers—

Single Action.....*95¢@$1.00*
Double Action, except 44 cal..*$1.85*
Double Action, 44 caliber....*$2.00*
Automatic.....*$3.25*
Hammerless.....*$3.75*

Riddles, Hardware Grade

16 in.....*per doz.*.*$2.50@$2.75*
17 in.....*per doz.*.*$2.75@$3.00*
18 in.....*per doz.*.*$3.00@$3.25*

Rings and Ringers—

Bull Rings—

	2	2½	3 inch.
Steel	*$0.70*	*0.75*	*0.80 doz.*
Copper	*$1.00*	*1.15*	*1.40 doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes.$4.00@$4.50
Hill's Ringers, Gray Iron.....*doz. 50@55¢*
Hill's Ringers, Malleable Iron..*doz. 70@75¢*
Blair's Rings...*per gro.$4.75@5.25*
Blair's Ringers.per doz. $0.60@ .65
Brown's Rings..*per gro.$5.00@5.50*
Brown's Ringers.per doz.$0.60@ .65

Rivets and Burrs—

Copper.....*40@41½%*
Iron or Steel.....*75@75&5%*

Bifurcated and Tubular—

Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—

Acme, Stowell's Anti-Friction.....50%
Cronk's Stay No. 65, $0.90; No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56.....$0.84
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger: Pure.....*lb., 12½¢*
Sisal, 7-16 in. diam. and larger: Pure.....*lb., 9¢*
Sisal, 7-16 in. diam. and larger: No. 2 quality.....*lb., 7½¢*
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed.....*lb., 7½¢*
Pure.....*lb., 9¢*
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed.....*lb., 7½¢*
Pure.....*lb., 9¢*
Cotton Rope: Best, ¼-in. and larger.16½@18¢
Medium, ¾-in. and larger, 15½@16½¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 8@8½¢
Thread, No. 2, ¼-in. & up, lb., 7@7½¢
Old Colony Manila Transmission Rope.....℔ lb 17½¢

Wire Rope—

Galvanized.....*37½&2½%*
Plain.....*45&2½%*

Ropes, Hammock—

Covert Mfg. Co.:
Jute, 45%; Sisal.....33⅓%

Rules

Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold .....27½&10&10%
Ivory .....35@35&10&10%
Miscellaneous .....50@50&10&10%
Stephens' Combination.....55@55&10%
Stationers' .....10@10&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag.....40%
Zig Zag, Pin Joint.....42½%
Upson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band .....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw, 40%; Wood Saws, 40%; Hand, Compass, &c., 40%.
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 14 in. wide.....60%
Band, ¼ to 1¾.....60%
Crosscuts 45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....25%
Woodsaw Blades.....25%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8.....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Key Hole, &c.....25%
Butcher Saws and Blades.....30%
C. E. Jennings & Co.'s:
Back Saws.....25%
Butcher Saws.....30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws.....30%
Hand Saws.....20&2½%
Wood Saw Blades.....35%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws.50%
Band Saws.....50%
Back Saws.....25@25&1½%
Butcher Saws.....35@35&1½%
Hand Saws.....25@25&1½%
Hand Saws, Bay State Brand.....40%
Compass, Key Hole, &c..25@25&1½%
Wood Saws.....35@35&1½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws....40&10@50%
Butcher Saws Blades.....35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades.....25%
Keystone Blades.....35%
Hack Saw Frames.....30%
Fitchburg File Works, The Best...35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.....40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades.....35%
Diamond Hack Saw Frames.....50%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames...30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades.....25%
Victor Hack Saw Frames.....40%

Scroll—
Barnes, No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....25%
Lester, complete, $10.60.....15&10%
Rogers, complete, $4.00.....15&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. .....doz. $5.50
Two Platforms, ½ oz. to 8 lbs. .....doz. $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales.....60%
Chicago Scale Co.:
The "Little Detective"....25 Da 50%
Union or Family No. 2.....60%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
"The Standard" Portables.....50%
"The Standard" R. R. and Wagon.50%

Scrapers—
Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $3.50@2.60
Ship....Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00.....45%
Chapin-Stephens Co., Box, 30@30&10&10%

Screens, Window and Frames—
Maine Screen Frames.....40&10&5%
See also *Doors.*

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@ 2.75; 1¼, $3.00@3.25; 1¼, $3.50@3.75
Bench Wood .....25@25&5%
Hand, Wood .....25@25&5%
R. Buss Mfg. Co., Hand....30@30&10%
Chapin-Stephens Co., Hand.....25%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 .....75&15%
Coach, Gimlet Point, list Oct. 1, '99.....75&10%
Hand Rail, list Jan. 1, '81.... 70&10@75%

Jack Screws—
Standard List.....75&10@80%
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50%
Swett Iron Works.....75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron.... 50@50&10%
Flat or Round Head, Brass.... 50@50&10%

Set and Cap—
Set (Iron).....80&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap.....75&10&7½%
Hex. Hd. Cap.....75&10&7½%
Rd. Hd. Cap.....60&10%
Fillister Hd. Cap.....60&10&10%

Wood—
List July 23, 1903.
Flat Head, Iron.....87½&10@..%
Round Head, Iron...85 &10@..%
Flat Head, Brass.....82½&10%
Round Head, Brass..80 &10@..%
Flat Head, Bronze...77½&10@..%
Round Head, Bronze.75 &10@..%
Drive Screws.....87½&10%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
	Per doz.
Grass, No. 1, Plain....	*$6.25@6.75*
Clipper, Bronzed Webb.	*$6.50@7.00*
No. 3 Clipper, Pol'd Webb..	*$6.75@7.25*
No. 6 Clipper and Solid Steel,	*$7.00@7.50*
Bush, Weed and Bramble, No. 2	*$6.50@7.00*
Grain, No. 1.....	*$8.25@8.75*
Bronzed Webb, No. 1..	*$8.50@9.00*
Nos. 3 and 4 Clipper, Grain..	*$8.75@9.25*
Solid Steel, No. 6.....	*$9.25@9.75*

Seeders, Raisin—
Enterprise .....25@30%

Sets— Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel.....₩ doz sets $9.00

Sets, Nail—
Octagon .....gro. $3.50@3.75
Buck Bros.....27½%
Cannon's Diamond Point, ₩ gro.$12.40%
Mayhew's .....₩ gro. $9.00
Snell's Corgated, Cup Pt....₩ gro. $7.20
Snell's Knurled, Cup Pt....₩ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt.₩ gro. $7.50

Rivet—
Regular list.....75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut.....30%
Plate 20%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $30.00...50%
No. 5, Mill, $39.00.....50%
Nos. 10, 11, 95, $15.60.....50%
No. 1 Old Style, $10.00.....50%
Special, $16.25.....50%
Giant Royal Cross Cut.....₩ doz. $8.00
Royal, Hand.....₩ doz. $4.50
Taintor Positive.....₩ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30.....
₩ doz., net, $24.00
Smith & Hemenway Co.'s.....60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co.....70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ₩ doz.....$1.50
Mounted Kitchen Sand Stone, ₩ doz.....$1.50
Natural Grit Carving Knife Hones, ₩ doz.....$3.00
Quick Cut Emery Carving Knife Hones, ₩ doz.....$1.50
Quick Edge Pocket Knife Hones, ₩ doz.....$2.50
} See

Skate—
Smith & Hemenway Co.....20%

Shaves, Spoke—
Iron .....doz.$1.10@1.25
Wood .....doz.$1.75@2.25
Bailey's (Stanley R. & L. Co.).....45%
Razor Edge (Stanley R. & L. Co.)..35%
Chapin-Stephens Co.....30@30&10&10%
Goodell's, ₩ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—
Cast Iron.. 7	8	9 in.	
Best $16.00	*18.00*	*20.00*	*gro.*
Good ...$13.00	*15.00*	*17.00*	*gro.*
Cheap .. $5.00	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fair quality, Nickel..75@7[illegible]&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@10&5%
Heinisch's Tailor's Shears.....10%
Wilkinson's Sheep, 1900 list, 30&10&5%
Grass, 50&10%; Horse or Mule, 50&10%

Tinners' Snips—
Steel Blades.....20&5@20&10%
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin, 50@50&5%
Heinisch's Snips.....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in.....50%
Niagara Snips.....40%
P., S. & W. Forged Handles.....20%

Pruning Shears—
Cronk's Hand Shears.....33⅓%
Cronk's Wood Handle Shears....33⅓%
Disston's Combined Pruning Hook and Saw, ₩ doz. $18.00.....25%
Disston's Pruning Hook only, ₩ doz., $12.00 .....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades....50&10%
P., S. & W. Co.....33⅓%
Wilkinson's Hedge, Wilcut Brand, 60&10%
Wilkinson's Lawn and Border, Wilcut Brand.....60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction.....50%
Reading 40%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....80%

Sliding Shutter—
Reading list.....40%
R. & E. list.....33⅓%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, Club, Rival, 10 and 12 gauge .....65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge 20%
Climax, Union, League, New Rival, 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge.....20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓
Robin Hood, Low Brass.....20&5%
Robin Hood, High Brass.....30&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade .....40&5%
Loaded with Smokeless Powder, high grade .....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron .....per keg $4.00
Steel .....per keg $3.75
Burden's, all sizes.....₩ keg $3.90

Shot—
25-lb. bag.
Drop, up to B.....$1.90
Drop, B and larger.. ..... 2.15
Buck 2.15
Chilled 2.15
Dust 2.35

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle.....$2.75@3.00
Wood and Mall, D. Handle, $3.25@3.50

Sieves and Sifters—
Hunter's Imitation..... gro.$9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50
Buffalo Metallic Blued, R. M. Co., ₩ gr.
14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic
—Per dozen.—
Mesh	14	16	18	20
Iron Wire....	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire..	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard List:
12 x 12 to 22 x 36 in....60&5%
20 x 40 to 24 x 50 in.....55%
24 x 60 to 24 x 120 in.....35%
Barnes' low list:
Up to and including 20 x 36 in....60%
20 x 40 to 24 x 50 in.....55%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron.....70@75&10%
Steel .....40@45%

Slates, School—
Factory Shipments.
"D" Slates.....50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless..60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German .....40@40&10%
Covert Mfg. Co.:
Derby, 30&2½; Yankee, 30&2½; Yankee Roller, 30&2½.
High Grade, 45%; Trojan.....45%
Jockey 35%
Oneida Community:
Harness Snaps, 1 inch.....60&5%
Swivel Snaps.....60%
Swivels 50%

Snaths—
Scythe 50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality.....50&10@60&5%
Cheap .....60@60&10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton .....40&10%
Rogers & Bro., William Rogers' Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%

Miscellaneous—
German Silver.....60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver.....50%

Tinned Iron—
Teas .....per gro. 45@50¢
Tables.....per gro.$0.50@$1.00

Springs— Door—
Chicago (Coil).....40&10%
Gem (Coil).....20%
Pullman (Coil).....25%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 30 in.....₩ doz. $1.10

Carriage, Wagon, &c.—
1¼ in. and Wider:	Per lb
Black	*4@4¼¢*
Half Bright.....	*4@4¼¢*
Bright	*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26.....per pr. $2¢
1½ x 3 x 28.....per pr. 75¢

Sprinklers, Lawn—
Enterprise .....25@30%
Philadelphia No. 1, ₩ doz. $12; No. 2, $15; No. 3, $24.....30%
Pleuger & Henger Mfg. Co.:
Cactus, 70%; Japanese, 75%; Nationals, 65%.

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } 75@80%
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 67½%; Iron Stock and Bevel.....20%
Winterbottom's Try and Miter, No. 1, 40%; No. 2.....50%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind.....lb. 6@6½¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples..... per lb. 3½@3½¢
Grand Crossing Tack Co.'s list..80&10%

Steels, Butchers'—
Dick's 30%
Foster Bros.'.....30%
C. & A. Hoffmann's.....40%

Steelyards— ....30@30&10%

Stocks and Dies—
Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25%

Stoners, Cherry—
Enterprise .....25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit.60%
Gem Corundum Axe, Single or Double Grit.....60%
Gem Corundum Slips.....60%
Gem Corundum Razor Hones....50%
Pike Mfg. Co., 1904 list: ₩ lb.
Arkansas St. No. 1, 3 to 5½ in.$2.80
Arkansas St. No. 1, 5½ to 8 in.$3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita, 4 to 8 in.60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in.50¢
Washita St., No. 1, 4 to 8 in.40¢
Washita St., No. 2, 4 to 8 in.30¢
Lily White Slips.....30¢
Rosy Red Slips.....30¢
Washita Slips, Extra.....30¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....40¢
India O. Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks.33⅓%
} See

Hindostan No. 1, R'g'lar, ₱ lb 8¢
Hindostan No. 1, Small, ₱ lb 10¢
Axe Stones (all kinds)
Turkey Oil Stones, Extra, 6 to 8 in. ₱ lb 30¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips 40¢
Sand Stone 6¢
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ₱ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots ₱ gro. $9.00
One gross or more ₱ gro. $7.20
Lots of 10 gross or more ₱ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S. ₱ gro. $12.00
Lamoille S. S. ₱ gro. $11.00
White Mountain S. S. ₱ gro. $9.00
Green Mountain S. S. ₱ gro. $6.00
Extra Indian Pond S.S. ₱ gro. $7.50
No. 1 Indian Pond S.S. ₱ gro. $7.00
No. 2 Indian Pond S.S. ₱ gro. $4.50
Leader Red End S. S. ₱ gro. $4.50
Quick Cut Emery ₱ gro. $10.00
Pure Corundum ₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
} 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers ₱ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ₱ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 60@60&10%

Plane—

Chapin-Stephens Co. 20%

Straps— Box—

Cary's Universal, case lots 25&20%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket dos. $1.60
Bullard, ₱ doz. $4.00
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00 20%

Strops, Razor—

Star Diagonal Strop 25%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%

Sweepers, Carpet—

National Sweeper Co.: ₱ doz.
Louis XV, Roller Bearing, Gold Plated $120.00
Hepplewhite, Roller Bearing, Silver Plated $72.00
Sheraton, Roller Bearing, N'kel. $60.00
Ye Mission, Roller Bearing, Oxidized Coppered $36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled $36.00
National Queen, Roller Bearing, Fancy Veneers $27.00
Loyal, Roller Bearing, Veneers, Nickeled $25.00
Triple Medal, Roller Bearing, Nickeled $24.00
Marion, Roller Bearing, N'kel. $24.00
Marion Queen, Roller Bearing, Nickeled $21.00
Monarch, Roller Bearing, N'kel. $22.00
Monarch, Roller Bearing, Jap. $20.00
Perpetual, Regular B'r'gs, N'kel. $20.00
Perpetual, Regular B'r'gs, Jap. $18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled $36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned $33.00
Auditorium (26 in. case), Roller Bearing, Nickeled $54.00
Mammoth (30 in. case), Roller Bearing, Nickeled $60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Model E, Sanitaire ₱ doz $25.00
Model A, Sterling ₱ doz. $25.00
Model B, Sterling, Nickeled ₱ doz. $23.00
Model B, Sterling, Japanned ₱ doz. $21.00
Model C, Sterling ₱ doz. $21.50
Model D, Sterling ₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks 90&10@—%
American Cut Tacks 90&10@—%
Swedes Cut Tacks 90&10@—%
Swedes Upholsterers' 90&50@—%
Gimp Tacks 90&50@—%
Lace Tacks 90&10@—%
Trimmers' Tacks 90&10@—%
Looking Glass Tacks 65@—%
Bill Posters' and Railroad Tacks, 90&50@—%
Hungarian Nails 85@—%
Finishing Nails 70&10@—%
Trunk and Clout Nails 80@—%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks 90&5 or 6 tens

See also Nails, Wire.

Tanks, Oil—

Each.
Emerald, R. M. Co. 30-gal. $3.40
Emerald, R. M. Co. 60-gal. $4.25
Queen City, R. M. Co. 30-gal. $3.65
Queen City, R. M. Co. 60-gal. $4.50

Tapes, Measuring—

American Asses' Skin 50@—%
Patent Leather 25@30&5%
Steel 33 1-3&5%
Chesterman's 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin 40&10@50%
Favorite, Duck and Leather 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin 40&10@50%
Metallic 30@30&5%
Patent Bend, Leather 25&5@25&10%
Pocket 40@40&5%
Steel 33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case 80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop 80&2½%
Monitor, Cross Head, &c. 70%

Brick Ties—

Niagara Brick Ties 25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White 20@20&5%

Hay—

Myers' Hay Tools 50%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s 25%

Saw—

Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—

L. & I. J. White 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida 75@75&5%
Newhouse 40@40&5%
Hawley & Norton 65%
Victor 70&10%
Oneida Community Jump 50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ₱ doz. $13.75
No. 3, Rat, ₱ doz. $6.50; case of 96 $5.75 doz.
No. 3½, Rat, ₱ doz. $3.25; case of 72 ₱ gro. $1.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 180 $2.25 doz.

Trimmers, Spoke—

Wood's E 1 50%

Trowels—

Disston Brick and Pointing 25%
Disston Plastering 20%
Disston "Standard Brand" and Garden Trowels 30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels ₱ gro. $6.00
Rose Brick and Plastering 25&5%
Woodrough & McParlin, Plasterers 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern 50&10%
Western Pattern 60&10%
Handy Trucks ₱ doz. $16.00
Grocery ₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern ₱ doz. $18.50
McKinney Trucks each $10.00
Model Stove Trucks ₱ doz. $18.50

Tubs, Wash—*No. 1 2 3*

Galvanized, per doz. $4.25 4.75 5.25
Galvanized Wash Tubs (R. M. Co.):
No. 1 2 3 10 20 30
Per doz., net $5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls 22@24¢
No. 12, ¼ and ½-lb. Balls 19@21¢
No. 18, ¼ and ½-lb. Balls 16@18¢
No. 24, ¼ and ½-lb. Balls 16@18¢
No. 36, ¼ and ½-lb. Balls 15@17¢
Chalk Line, Cotton ½-lb. Balls 25@30¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. 10@18¢
Cotton Wrapping, 5 Balls to lb., acording to quality 14½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls 13@14¢
American 3-Ply Hemp, 1-lb. Balls 13@14¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 9@10¢
India 3-Ply Hemp, 1-lb. Balls 9@10¢
India 3-Ply Hemp, 1½-lb. Balls 8½@9½¢
2, 3, 4 and 5-Ply Jute, 1-lb. Balls 10½@12¢
Mason Line, Linen, ½-lb. Bls. 46¢
No. 26½ Mattress, ¼ and ½-lb. Balls 57¢
Wool, 3 to 6 ply A 7½¢; A 8½¢

Vises—

Solid Box 60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 10%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 5A, $7.00; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting 25@25&5%
Tiger Machinists' 40%
Fisher & Norris Double Screw 15&10%
Hollands':
Machinists' 10@4&5%
Keystone 65&40&10%
Lewis Tool Co.:
Adjustable Jaw 30%
Monarch, 50%; Solid Jaw 50%
Massey Vise Co.:
Clincher 40%
Perfect, 20%; Lightning Grip 20%
Merrill's 20%
Millers Falls 60&10%
Parker's:
Victor, 20@25%; Regulars 20@25%
Vulcan's 40@45%
Combination Pipe 55@60%
Prentiss 20@25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps 30%
Perfection Saw Clamps, ₱ doz. $4.50
Reacing 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 45@50%

Wood Workers—

Massey Vise Co.:
Lightning Grip, 15%; Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise 60&10%
Holland's Combination Pipe 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up 60¢
B. E., 9 and 10 70¢
B. E., 8 80¢
B. E., 7 80¢
P. E., 11 up $1.00
P. E., 9 and 10 1.25
P. E., 8 1.50
P. E., 7 1.50
} Dis. 15%
Ely's B. E., 11 and larger $1.70@1.75
Ely's P. E., 12 to 20 $3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 55%
Ground 60%
Plain or Unground 65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles 70%
Covered Wares
Tinned and Turned 40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware 60%
Iron Clad Ware 70&10%
Lava, Enameled 40&10%
Never Break Enameled 50%

Tea Kettles—

Galvanized Tea Kettles:
Inch 6 7 8 9
Each 45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Spiders and Griddles 65@65&5%
Avery Kettles 60%
Porcelained 50&5@50&10%
Never Break Spiders and Griddles 65&5%
Never Break Kettles 60%
Solid Steel Spiders and Griddles 65&5%
Solid Steel Kettles 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone 40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame $3.25
Red Star, family size, stationary protector $3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.90
Cable Cross, family size, stationary protector $3.15
Single Zinc Surface:
Naiad, family size, open back, perforated $2.65
Saginaw Globe, protector, family size, ventilated back $2.50
Brass Surface:
Brass King, Single Surface, open back $3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.25
Glass Surface:
Glass King, Single Surface, open back $3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back $3.25

Washers—Leather, Axle—

Solid 80&10@80&10&10%
Patent 90@90&5%
Coil: ⅞ 1 1¼ 1½ Inch.
10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt 5-16 ⅜ ½ ⅝ ¾
Washers $3.40 4.50 3.20 3.00 2.80
The above prices are based on $6.00 off list.

In lots less than one keg add ½¢ per lb.; 5-lb. boxes add 1½¢ to list.

Cast Washers—

Over ⅛ inch, barrel lots per lb. 1¾@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4 40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 50&10%

Wedges—

Oil Finish lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co. 40%

Sash—

Per ton, f.o.b. factory:
Eastern District $27.50@$28.00
Southern Territory $20.00@$23.00
Western and Central Districts $23.00@$25.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 80%
10 to 18 80&2½%
19 to 26 80&7½%
27 to 36 80&2½%
Galvanized:
6 to 9 75&5%
10 to 14 75&7½%
15 to 16 72½&10&2½%
19 to 26 75%
27 to 36 72½%
Coppered:
6 to 9 75&5%
10 to 14 75&7½%
15 to 18 72½&10&2½%
19 to 26 75&10&5%
27 to 36 75%
Tinned:
6 to 14 73&10&2½%
15 to 18 75&7½%
Annealed, Steel and Tinned, on Spools 70&10&10@70&10&10&10%
Brass and Copper on Spools 60&5@60&10&5%
Brass 70½%
Cooper 10%
Cast Steel Wire 50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24 '03 90&20@90&25%
Brass Cup Hooks and Brass Screw Hooks 85@—%

Wire Cloth and Netting—

Galvanized Wire Netting 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.00@1.10
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3¢
Nos. 4 and 5 Mesh, sq. ft. 3½¢
No. 6 Mesh, sq. ft. 3½¢
No. 8 Mesh, sq. ft. 4¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural 80@80&5%
Alligator or Crocodile 70&10@75%
Baxter Pattern S Wrenches 70&5@70&10%
Drop Forged S 45@45&5%
Acme 60&10%
Alligator Pattern, 70%; Bull Dog 70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Bemis Pipe 60%
Combination Black 40&5%
Merrick Pattern 50
Boardman's 40%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model 40&10&5&5%
Coes', Genuine Hammer Handle 40&10&5&5%
Coes' "Mechanics'" 40&10&10&5&5%
Donohue's Engineer 40&10%
Eagle 50&10%
Elgin Wrenches, ₱ doz. $6.25
Elgin Rethreading Attachment, one die, ₱ doz. $6.25
Elgin Extra Dies, ₱ doz. $3.00
Elgin Extra Jaws, ₱ doz. $1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz. $2.10
Gem Pocket 70%
Hercules 70%
W. & B. Machinist:
Case lots 50&5%
Less than case lots 50%
W. & B. Railroad Special:
Case lots 50%
Less than case lots 40&10&5%
Solid Handles, P., S. & W. 50&5%
Stillson 65%
Vulcan Chain 50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz. $0.80

Wringers—

Tuttle Roller Press Mop Pail Wringer, each, $8.00; ₱ doz. $48.00

Wrought Goods—

Staples, Hooks, &c., list March 17, '92 90@90&10%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' list net

Zinc—

Sheet per 100 lbs., $8.13@8.40

For the Table of "Current Metal Prices," see the First Issue of Every Month.